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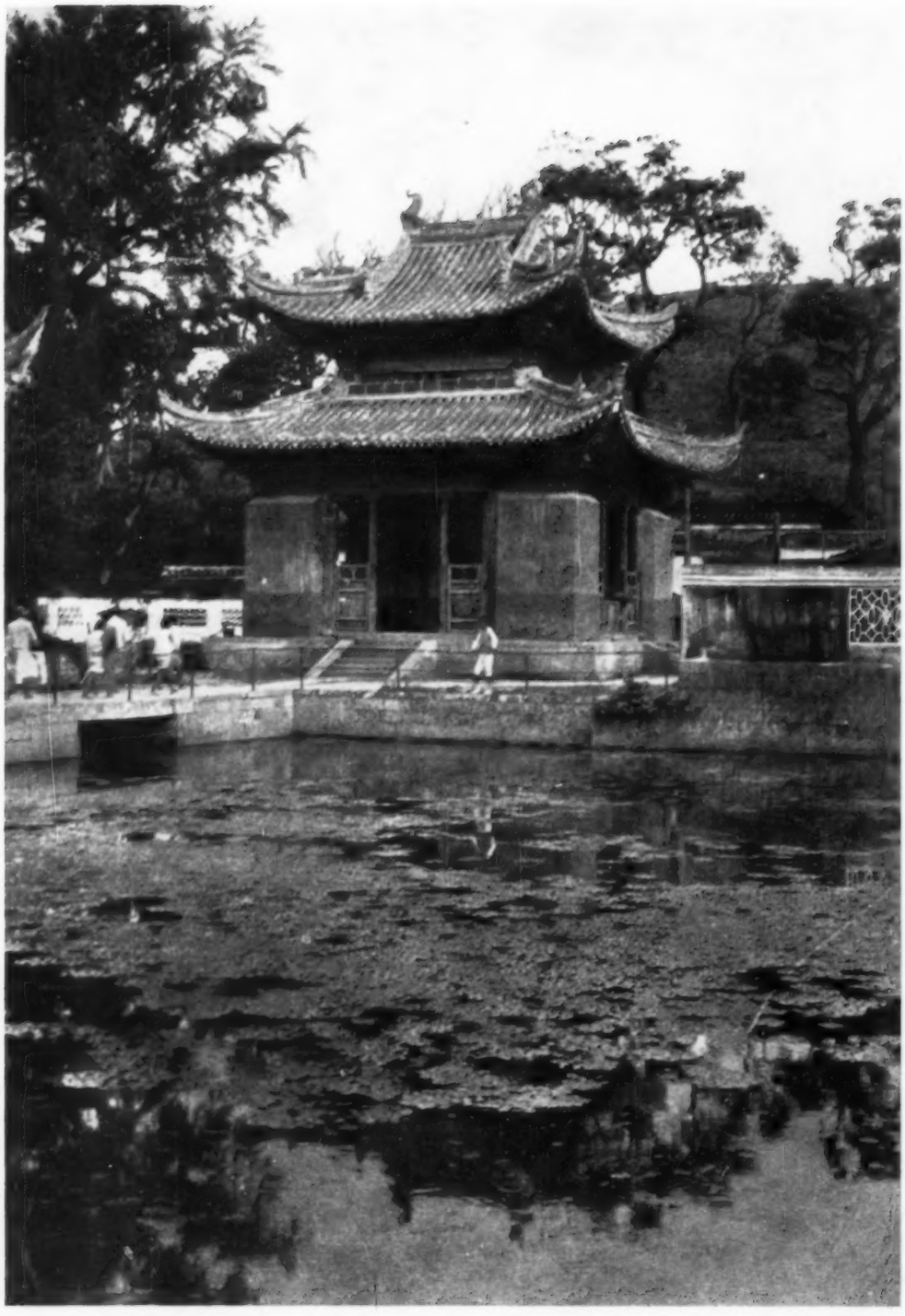


PAVILION ON THE ISLAND OF PO TO, NEAR SHANGHAI

The sturdy walls are of deep red stucco and the roof covered with old iridescent yellow tile, while the eaves, with their carved bracket forms, are in a bizarre variety of strong colors.

Photographed by Edwin L. Howard

The
ARCHITECTURAL
FORUM

VOLUME XXXVI JUNE 1922 NUMBER 6

Garden Design

SOME INFLUENCES AND OPPORTUNITIES

By EDWARD CLARK WHITING, *of Olmsted Brothers, Landscape Architects*

THIS article makes no attempt to cover the whole broad field of garden design. It has little direct relation to public parks or to the larger elements of landscape development, but is merely an attempt to sketch some of the limitations and opportunities which should influence the planner of gardens.—THE EDITOR.

GARDEN design is governed by the same general principles and accepted tenets of composition that apply to every fine art. There must be symmetry or balance; there must be unity; there must be harmony of lines, forms and colors; there may be rhythm; there should be variety, but unlike the tapestry on the museum wall or the "landscape" of Corot, a garden is never a fixed or completed work of art, and it is seldom entirely under the control of the designer. The sun, the clouds, the sky, the enclosing woods and the distant landscape are inevitably parts of the garden composition; living materials, such as flowers, shrubs and trees are the chief mediums of the designer's work—and these are changing from hour to hour, from day to day, from year to year. The garden designer must understand these living qualities of his materials, and he must appreciate the influence of those larger and perhaps more dominating elements of site and environment over which he has comparatively little

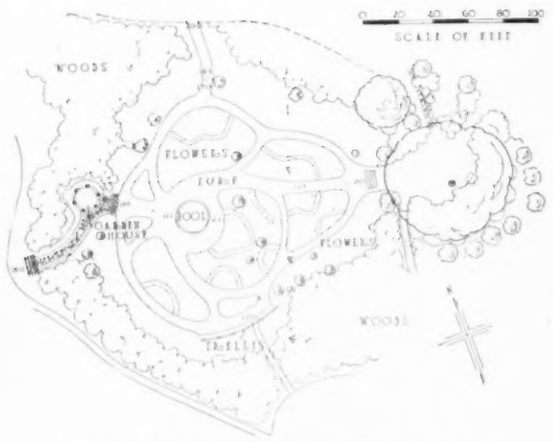
That Composite Quality of Light and Form and Color, of Odors and Associations

The Willow Pool
A garden picture of restful beauty and entirely free from architectural control

control, for it is in both these sorts of conditions that are found the peculiar opportunities of the art.

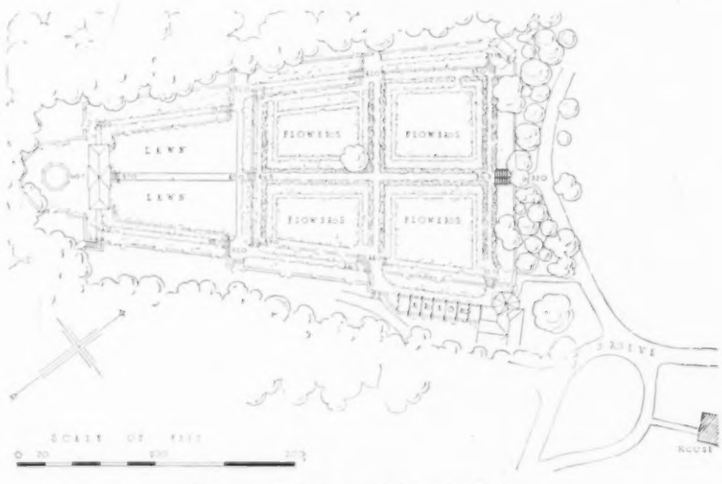
Financial or other arbitrary restrictions affect the quantity rather than the quality of the work; use and custom are obvious requirements which hardly need elucidation, but the influence of environment is so subtle and varying in the manner and degree of its control that it will bear analysis. For convenience it may be divided into two fields,—the architectural or stylistic influence, usually established by the house, and the influences emanating from the conditions of the site.

If the garden is close to the house, if it is definitely and organically and visibly related to the house, there should be an evident harmony between the two—a harmony of line, form, material and color. And if the house is of a distinctive, well recognized style, the garden should reflect the same historic or geographic precedents. It must be remembered, however, that in the gardens of all times and all places the distinctive style or character has been determined primarily by social habits and customs, by the local conditions of site and by the special plant materials available. And it is for this reason that exotic garden precedents can be followed *only* insofar as they are capable of adaptation to the new conditions of climate, site and social customs. Plant forms and garden ornaments of clearly appropriate character, and the use in both garden and house of architectural details of the same period, together with a certain similarity or sympathy in the units and the scale of the designs are generally sufficient to produce the desired harmony of style or of association. Even under the most exacting conditions of architectural influence the requirements of style are not very restricting. Properly understood, they become little more than a unifying element in the garden design.



A Free, Informal Garden Plan Suggested Entirely by Environment

The less pronounced the style of the house, the smaller will be its influence upon the style of the garden. Also, the less definite and organic the tie between house and garden, and the more obscure the visible relation between the two, the less influence will the one exert upon the design of the other. But even in the most extreme case of disassociation, a well recognized and pronounced style in the house should be reflected to some extent in the distinctive



Plan of a Garden at Cold Spring Harbor
Entirely independent of the house, but strongly influenced by the dominant conditions of the site

features of the garden. The importance of this stylistic influence and the extent to which it should be recognized in garden design must in the end depend upon the relative importance or dominance of the house and of such other influences as may be present. There are few cases, however, where it is not worth while to secure some degree of harmony by the use of like or similar elements in the design of both house and garden to bind them in sympathetic relations.

Intricacy in Design, Freedom from Convention in Details, Infinite Harmonies of Form and Color with Lights and Shades — These Enrich a Garden

The most frequent, most varied, and usually the most dominating influences in garden design are those of the site. Limitations of a sort, they are at the same time opportunities. They are the opportunities which more than anything else make for the individuality of gardens. Indeed, that garden is very rare which does not show in some degree the influence of the particular place in which it is built.

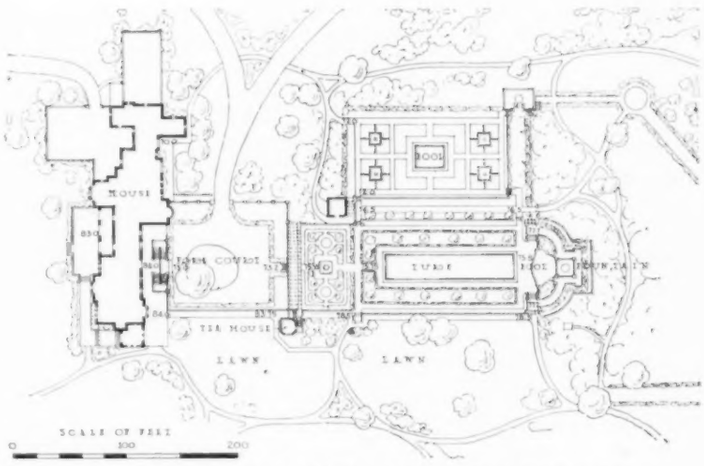
But what are those conditions of a site which may control or influence a garden? In the first place the available area is often limited in both size and shape, and the garden must be cut to fit. Then there are the ground forms—a flat meadow, a sloping hillside, a rounding hilltop, a valley of gentle slopes or with steep floor and precipitous sides—different in each and every case. Then there are the backgrounds and enclosures—open hillsides, dignified woods of pine or the lighter woods of deciduous growth, individual trees or groups of trees, cliffs, established walls or buildings, in fact any established conditions around the site which must or which may remain to take their parts in the garden scenes. Within the site there may be trees, fully grown and of distinctive character; there may be dignified old box plants and hedges; there may be

Corner of a Garden at Cold Spring Harbor
It is among those gardens conceived in a full and sympathetic understanding of the "genius" of the place that real garden magic is most often found

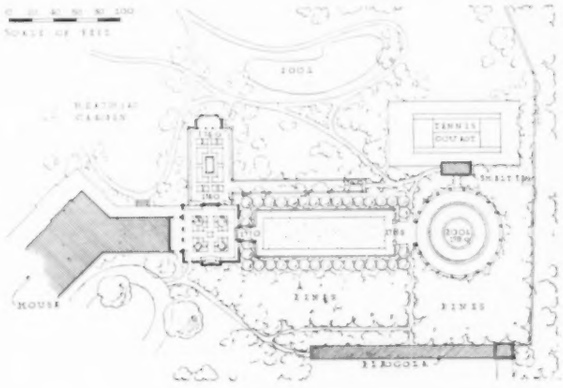
other elements of marked character and association which can be utilized in the garden scheme. Then there are the views of distant landscape, and finally there are the lights and shadows and the subtle atmosphere of established character.

In what manner and to what extent a garden should be influenced by these conditions of the site can hardly be prescribed, but may better be suggested by specific examples. The garden illustrated on plate 95 shows an interesting combination of influences; the architectural details were clearly dictated by the style of the house (Elizabethan), whereas the size and shape of the garden were quite definitely limited by the area available and by the unusually fine trees about it. Impressive as a background, these trees by their size and character clearly dominated the scene, and to avoid conflicts of scale and confusion of interests the flowers, in their intricate details of colors and textures, were placed at either side, while the whole central element of the picture from the house was kept in simple surfaces of turf and water, a foreground for the trees.

In the ravine garden (plate 93) the relation to the house is obscure, but the house is not far away and its pronounced style—old English Gothic—is reflected in the garden details. The site was a narrow gulch in the edge of the woods and extended from the lawn at the upper end to a terraced vegetable garden at the lower. The straightness of the ravine, a distant glimpse it provided across the city and the fact that it was in a sense a "way" from one part of the grounds to another, suggested a defined axial



Plan of Garden of J. E. Aldred. House of English Tudor Style



Plan of Garden. House of Free Italian Style

Even under the maximum architectural influence there is unlimited opportunity for variation in the garden plan

The Most Intimate Relation between House and Garden

The style of the house is reflected in the architecture, materials and details of the garden, but there is a happy freedom and appropriateness in the planting

treatment. The garden is essentially an elaboration of the axis, and needs no other control to give it unity. It melts gradually into the informality of the wooded banks that frame the picture. Water, sunlight and the ever-changing shadows from overhanging trees give it life and atmosphere.

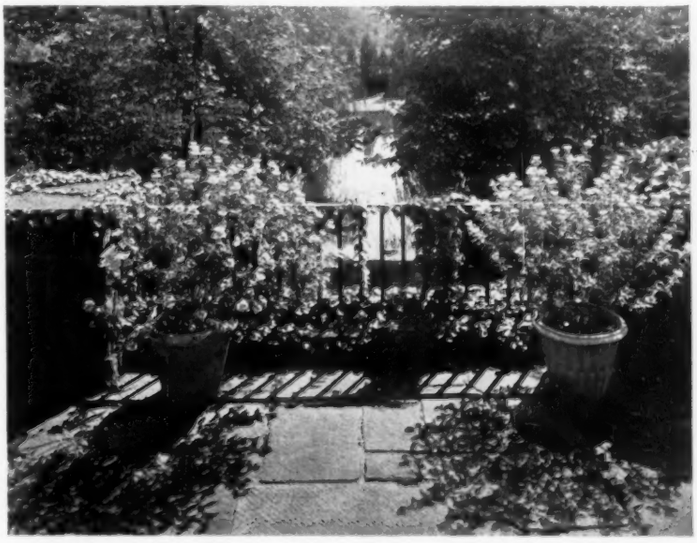
In the garden at Ipswich (plate 94) the strength and dignity of the surrounding woods dictated the simple lines and forms of the garden, and a restrained but well considered use of architectural accents and a careful selection of plant forms have given it distinctive character and interest.

In the garden at Cold Spring Harbor (plan on page 212, illustration on page 213) the old box hedges of a former garden de-

Detail in the Garden of J. E. Aldred, Esq.
An interesting composition of quiet water, clean-cut architectural lines and distinctive plant forms

termined the main axis and cross walks, in fact became the key to the new design. The garden outline and the arrangement of terrace planes were suggested by the form and slope of the valley. Strong enclosing walls give adequate unity to an unconventional and rather free design. A garden planned wholly in response to the topography, the enclosures and the subtle atmosphere of established character, it has distinct individuality and the beauty of fitness.

Every set of conditions presents a different problem, and after all they are problems to be solved in each case by the garden designer according to the light of his personal perceptions and genius. If the site is flat and devoid of striking features, its influence is clearly passive and subordinate, but by its very lack of positive guidance it seems to suggest the more straightforward and balanced design and perhaps the more formal interrelation between house and garden. On the other hand, if the site is a steep ravine, plunging down between protruding cliffs and framed with picturesque woods, its influence on the garden is absolutely dominating. Between these extremes are infinite variations in the character and degree of influence exerted by the site. It is safe to say that the garden which shows no recognition of its environment lacks some element of harmony and fitness; it may even lack that subtle quality which distinguishes the real work of art from the commonplace, for it is among those gardens conceived and built with a full and sympathetic appreciation of the "genius" of the place



Sunlight in the Garden

that individuality and the charm of real garden magic are most often found.

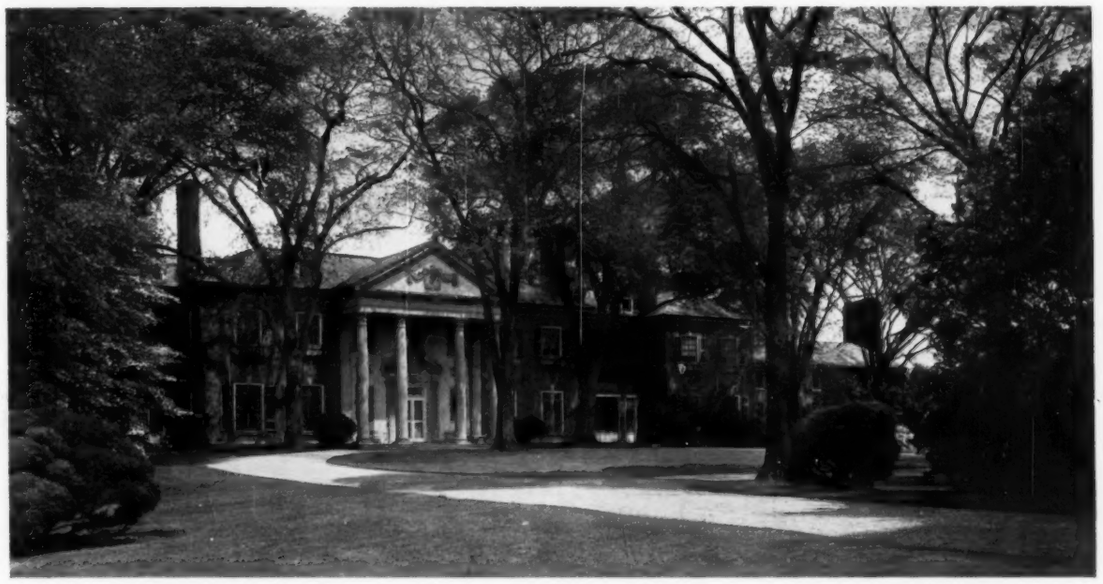
In addition to these various influences of environment there are certain opportunities in garden making and certain qualities in the finished garden that will bear emphasis.

The opportunities for distinction and special interest in the plan of a garden are not always adequately appreciated. There are inexhaustible possibilities of variety not only in the general garden concept but in the just adaptation of parts and in the details of development as well. The plan is the basic skeleton upon which the garden is built, and whether simple or complex, rigidly formal or free, it exerts a distinct control upon the finished work. It places the lines and the accents of the picture. It is not necessary to be original to the point of freakishness, but it is certainly desirable to avoid the stereotyped in garden making as in any fine art. Simplicity is often appropriate and desirable, but when it becomes a screen for paucity of ideas it does not satisfy.

On the other hand, it is possible to over-emphasize the plan as such, for an agreeable pattern does not in itself always assure full measure of garden beauty. A garden of clean-cut lines and rigid forms, obviously planned and controlled in all its parts, but having no more regard for the living qualities of its plants than did the French or Italian gardens of "mosaiculture," may be interesting as a mechanical achievement or "stunt"; it may be fitting under certain special conditions; it may be beautiful as a tapestry or rug is beautiful, but it is not likely to have that artistic merit which is achieved only by the appropriate use of the mediums of expression. The ultimate forms, the textures, the colors and the infinite details and subtle harmonies of the garden pictures are made of *living* materials, and it is in the happy balance and pleasing contrasts of these free growing elements with the rigid elements imposed by man's control that the most satisfying beauty in garden design is attained. It is that quality of life and growth which distinguishes the garden from the static work of art; it is that quality which requires time for its fulfilment, and is marked by a greater and richer beauty year by year. Intricacy in design and variety or freedom from convention in the handling of details stimulate the imagination, enrich the garden and give it a peculiar interest. Every path and nook and corner is an opportunity, and the wealth and variety of plant forms are a generous palette with which to work.

In that garden which is rich in beauty and interest and suggestion, which has achieved a full measure of harmony with its environment, we are almost sure to find the subtle quality which for want of a more definite word we call atmosphere. It is perhaps that quality which tempts the artist to linger and to paint—the true test of success in a garden.

The Cedar Alley
Garden of Nelson Doubleday, Esq., at Oyster Bay



The Manor House, Glen Cove, Long Island — Charles A. Platt, Architect

Planting for Architectural Effect

By RUTH DEAN, LANDSCAPE ARCHITECT

IT is often impossible to say how much of beauty is inherent in the object to which we attribute it, and how much to external circumstances,—how much for instance of a diamond's sparkle is due to the purity of the stone and how much to its contrast with the velvet on which the jeweler displays it; or what portion of a woman's attractiveness is her proper possession and what portion is contributed by the setting she has been clever enough to give herself. In architecture the interplay of building and entourage, of structure and landscape, forms an almost inseparable unit, and our admiration for a good building is unconsciously increased by a pleasing setting, just as our displeasure is spontaneously evoked by one which is poor. Moreover, the effect of bad architecture may be minimized to a great degree by beautiful surroundings, and the effect of good design all but lost by unfortunate landscape. The value of skillful planting is beyond all calculation.

The ways in which planting and architecture interact to produce the result which delights or displeases us are many and somewhat complicated to analyze, but perhaps the first of these is through light and shadow. The house which appears between the trunks of trees, striped and flecked with shadow shapes, has a charm entirely lacking in the house which exposes its four elevations boldly to an unobstructed gaze, and these shadows need to be taken into consideration in the planting just as the shadow cast by the cornice of a building or that made by the depth of the reveals around the windows is taken into account by the architect in detailing his house.

It is even possible to design to some extent in plant shadows as it is in architectural shadows; the plain wall can be given interest and texture, or a dead brick wall can be brought to life by the movement of leaf shadows on its surface or by shafts of sunlight let in through branches. Unbroken sunlight or solid shadow would not have this vivifying effect, because it is the movement of the shadows as well as the contrast between light and dark which produces it. As the high light of a picture is the spot which catches the eye, it is the important or especially well designed part of the house which needs to be thrown into relief by the planting, and conversely the less pleasing or unimportant parts which can be made to recede by the use of foliage shadows.

Frequently with reference to the planting about a house someone remarks, "I do not want trees close to my house; they make it damp and shady." This remark is sure indication that at one time or another its author has lived in a house too closely shrouded by trees—in the dense shade of a horse chestnut or a linden perhaps, or the funereal somberness of Norway spruces; from such an experience it is inevitable that one should generalize about trees near houses, for nothing is less interesting than the deep, heavy shadow cast by the close foliaged type of trees; indeed the actual gloom such

The old oaks create for this house a setting which could not be more picturesquely English nor more perfectly in sympathy with the architecture

House of Allan S. Lehman, Esq., Tarrytown, N. Y.
John Russell Pope, Architect

trees have laid over many a household is apparent in this frequent prejudice against trees near a house. Far different are the gracious, changing shadows of the elm. A tall-arched tree with waving, not too solid, foliage, it is one of the happiest for use near a house. Locust makes a lacy shadow which, together with the stippled shadow of birch, pepperidge or wild cherry, is light and restless, delightful as gay notes in the landscape, but not to be used where repose and dignity are the qualities desired. These are attributes of the long, firm shadows of oaks, or of the majestic shadow of a beech, or of the solid—but not too solid—shadow of a sugar maple.

Shadows and foliage mass are so interdependent that it is hard to say what portion of a given landscape effect is due to shadow and what to character of foliage; these two considerations, namely, type of shadow and mass form of foliage, should go hand in hand in determining what sort of planting the architecture demands—whether it be round, solid mass and consequent shadow, such as that of the maple, beech or linden, or the longer, less heavy shadows that belong to the dignity of oak and elm, or the light dappled quality of birch, hornbeam, ironwood and locust, or the pointed foliage and shadow mass of cedar or arbor vitae.

Out of this consideration of mass grows the question of the scale of the planting in relation to the architecture. Is the low evergreen one is about to plant under the dining room windows going to grow into a tall forest tree, dwarfing the house and obscuring the view? Are the cannas and geraniums around the foundations of the monumental post office adequate, as a means of tying a very handsome building into its surroundings? They may satisfy the caretaker's desire for color, but after all is a red ruffle, however glowing, sufficient decoration around the base of the building? It is not alone the present bulk of the plant one needs to inquire into and consider; flowers will stay flowers and never rise to the point of making the post office look at home in the landscape, but hemlocks and spruces will not remain bushes; presently they will be trees and their bad scale as foundation planting and their effect on the architecture of the house will be apparent.

Of late years the zeal of the nursery trade has somewhat overdone this question of foundation planting; houses are frequently buried in masses of different colored evergreens, inappropriate individually and ugly and ill assorted in mass, with a result which is not only compiete ruin to the architectural dignity of the house, but an offense to nature as well. Most of these evergreens are young trees that ought still to be in the nursery cradle, and at no stage of their development is their place in a group of foundation planting. For this purpose we have shrubs and low-growing evergreens, friendly spreading things that, sparingly planted here and there between windows, at each side of a doorway, or at the corners of the house with a few taller growing things in the group to carry the greenness up, tie the house pleasantly into its surroundings.

Planting near the house may be the means of doing the architect a good turn in another way. It may be made to supplement an unsatisfactory

architectural mass, by drawing out a too short elevation, lengthening a line, hiding a disappointing wing the proportions of which seemed to be dictated by harsh necessity or an uncomprehending client.

One of the most interesting reactions between architecture and planting is that of the material of the building with the texture of leaves. Evergreens, the foliage of which is in general coarser and more leathery than that of deciduous plants, seem to be most at home near masonry construction; frame buildings, for some reason or other, look best with the bulk of the planting deciduous. Take rhododendrons for example; perhaps it is something of the atmosphere of their native habitat, mountainous, rocky regions and the borders of stony mountain streams carried over to civilization, which makes their coarse waxy leaf seem handsomer near a stone than a frame building; perhaps it is only that wood, being lighter than brick or stone, demands a less heavy-textured planting.

A modern Colonial house which has the right sort of planting to supplement the design of the building

House of Marshall Fry, Esq., Southampton, L. I.
Aymar Embury II, Architect. Planting by the owner

Quite a different point of view from which to consider the relation between architecture and planting is that of style. When an architect comes to the detailing of a building he designs columns, mouldings, brackets, balustrades, which shall be in keeping with the character of his structure; if it is a Georgian house, the detail is quite different from that of a French or Italian house; if it is a Spanish mission building the colonnade which he is apt to use will bear no resemblance to the cloister of a collegiate Gothic structure. But beyond sketching a few tall-pointed trees which purport to be cypresses on a rendering of an Italian house, the possibility of carrying this process of appropriate detailing into the out of doors, to the plant material which surrounds the house, occurs to but few architects. Presumably any architect will have looked over the site where his house is to go before the house is designed, and if his client has no strong predilections which have to be followed, will have recommended a style of architecture which is more or less appropriate to the setting. But that the setting can be heightened in effect, or that it can be spoiled altogether, according as the management of planting detail is skillful or bungling, is something which is usually accorded slight consideration.

The landscape surrounding this house has a Spanish quality, due not more to the California sky than to the skillful use of the right sort of plant material

House of Mrs. E. M. Fowler, Chino, California
Myron Hunt, Architect

One can, of course, draw no such fine distinctions in plant material as can be made in house detail; there are no shrubs about which can be said, "These are Italian renaissance"—no foliage which can be classified as English Tudor; oaks have outlasted many styles of architecture and the pine did not come in with the classic revival. On the other hand, there are certain trees and shrubs which we unconsciously associate with the spacious dignity of an English park, others which bespeak an Italian atmos-

TheTypical New England Farmhouse, with Its Elm Tree and Lilacs

phere, and others which belong to New England colonial. Of course if a Georgian house is to be set down in a piece of desert where the cactus is the only plant that thrives, it will be difficult to create a colonial atmosphere for it; but within the limits imposed, or the possibilities offered by the native vegetation, it is surprising to discover how greatly and in what various ways the character of the house can be heightened.

Let us suppose, for example, that we have to make the landscape for a house of informal English design. English oak, like French wine and Russian leather, is proverbial, and the landscape which immediately springs to mind as being typically English is one with rolling hills wooded with oak—white oak preferably. There is something about a rising stretch of green lawn with a group of white oaks on the rise that bespeaks England at her best. Compare, if you will, this sort of landscape with the stupidity of a lawn planted with coarse, heavy Norway maples—trees recommended as being fast growers and subject to no blight. "Fast growers," they may be, but they are as well monuments to our undignified eagerness for a quick effect, trees without character or quality, which squat heavily on our lawns, a crude green in summer, a faded yellow in the fall, and uninteresting skeletons in winter. The oak on the other hand is noble whatever the season; lustrous leathery leaves of a rich dark green, beautifully disposed on a sturdy frame, glowing red in the fall, hoary and dignified in winter. The Norway maple is only one of a number of nursery pests that have supplanted to a great degree our fine native trees. Holly likewise and hawthorn are essentials of the English landscape, and beech and hornbeam and yew. I do not mean to renounce native materials for exotic plants by any means, but these things all have American counterparts save the yew, and the point to be made is that by a judicious choice of our own trees it is possible to produce a landscape which shall supplement the architecture of the house in feeling as well as in form.

The New England colonial house has a native American setting, easy to obtain if one but studies the old examples. Whoever saw a white clapboard house in Massachusetts, Connecticut, Maine or Rhode Island which did not have its group of lilacs near the corner, or a clump bursting out of the top of an old stone wall, or a row forming a hedge along the road? Where is the yard which does not boast an elm? Whatever else may have been added later, these two things were the first plants to soften the outlines of the New England house, and they have remained through two centuries the keynote of a happy setting for the white house with its green blinds.

For Italian houses we have the cedar and the arbor vitae, which alas will not reach the majesty of the cypress, but which are our best substitutes. For the olive groves so characteristic of Italian landscapes we have in our northern latitudes nothing similar, but on the other hand it is quite possible to use fruit trees ornamentally as do the Italians, and the plane and chestnut trees are ours for the planting. Ilex and boxwood we can grow to some extent. The laurel-leaved willow, the foliage of which is quite Italian in feeling, is hardy and there is nothing to prevent our using earthenware pots containing orange and lemon trees that characterize Italian gardens, excepting the trouble of taking them inside in the winter. From Virginia on south we can add the waxy leaves of the magnolia grandiflora to our Italianesque planting, besides Carolina cherry, Euonymous japonica, palms and a host of other things.

It is certainly not for lack of proper plant material that our architecture often wants a sympathetic setting, but rather for its undiscriminating use. Architect and landscape architect working together should be able to realize an appropriate background for any architecture the style of which has been chosen with reasonable reference to its suitability to the type of country in which the building is to stand.

To each of the older sections of the country there belongs a type of architecture which is identified historically with the locality; these types cover a wide range, from the severe colonial of New England to the Spanish and French of Louisiana, and it will be found that for each type there exist trees and plants which are in keeping.

of the freer growing orange

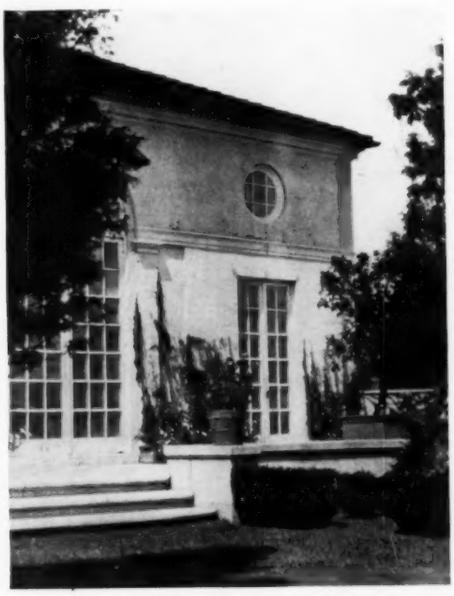
An Italian Garden at Groton, Conn.

GUY LOWELL, ARCHITECT; A. R. SARGENT, LANDSCAPE ARCHITECT

THIS is an Italian garden that really recalls the spirit and beauty of those in Italy because it reproduces, with a fidelity generally impossible in this country, those features that are distinctly characteristic of the best old villa gardens. These features of the Italian garden are:

First. Great skill in design which takes advantage of the rising and falling grades with the accompanying use of terraces and steps connecting the ever-varying levels. If one can get the various elements of architecture and gardening properly combined under the deep blue sky of our New England coast, the garden will have the brilliant, sparkling qualities of the famous Tuscan gardens.

Second. A freedom and richness of planting that are usually almost entirely absent in American gardens because of the attempt to make the symmetrical bay tree and the clipped box take the place



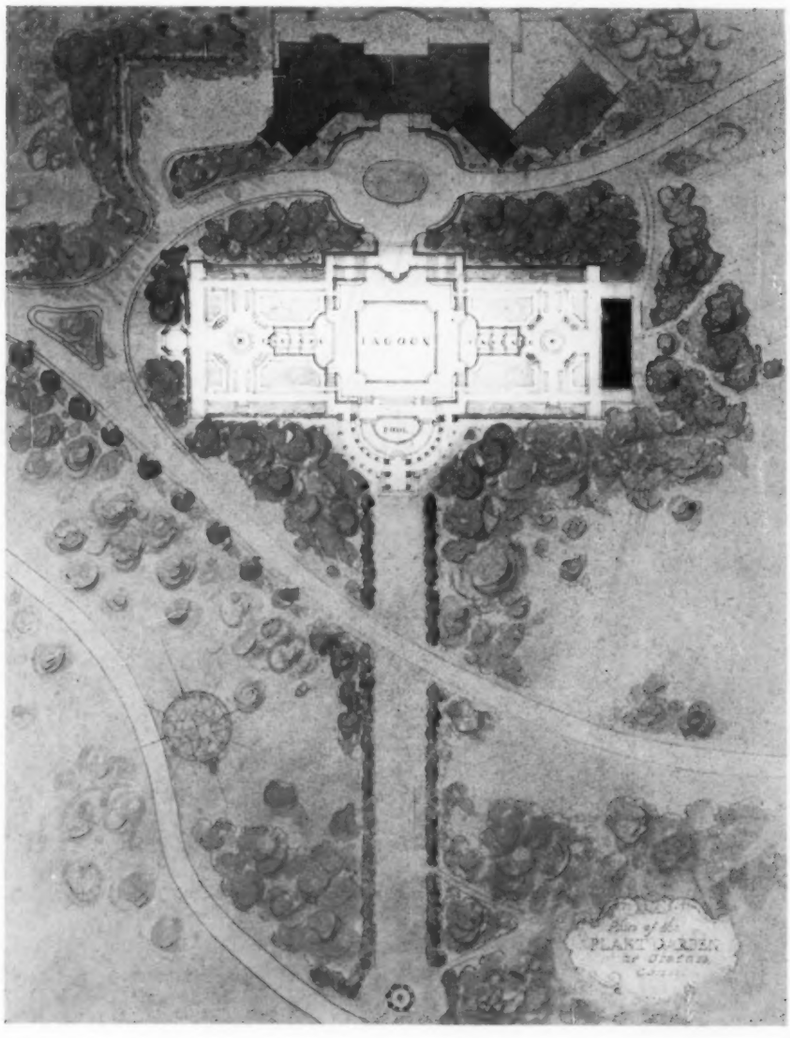
of the freer growing orange tree, pomegranate and oleander. It was in getting together this remarkable and rare assemblage of tub trees, which Mr. Sargent collected and arranged so skillfully, that made possible the feeling that this is a garden truly in the Italian style.

Third. A rush of water, considered necessary for life in the Italian garden. This was possible here, and the effect of all this water in shimmering pool and cool cascade is heightened by the glimpses that one gets of the bay and of Long Island Sound.

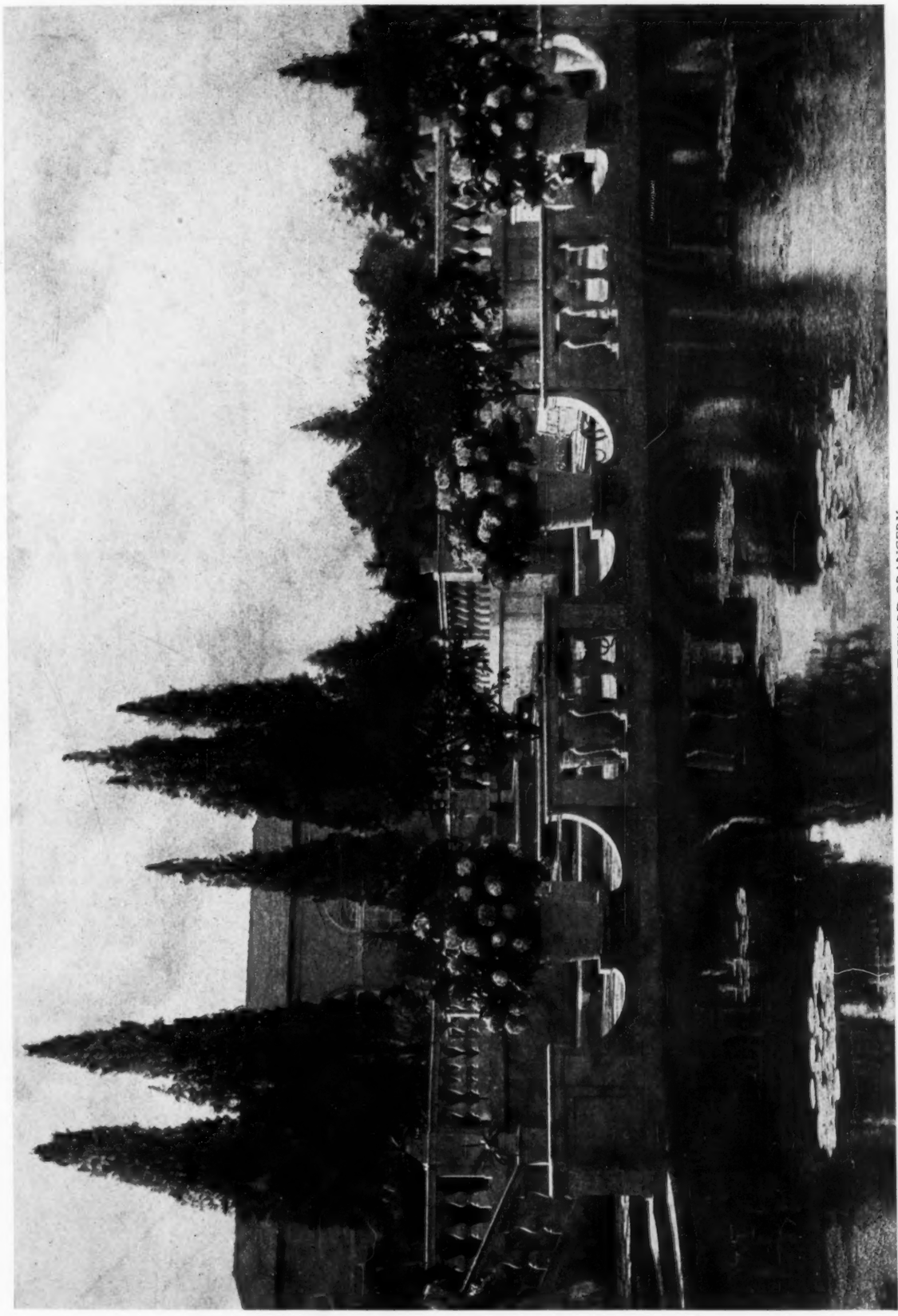
It is not age and crumbling stone and moss-covered marble that make the Italian garden, for in certain of the Tuscan gardens the stonework is as crisp and true as when it was quarried centuries ago. It is the beauty which the architect has known so well how to put into his architectural work and the skillful arrangement of trees and of flowers that the landscape architect has made that give this most charming of American gardens its quality. There are of course some variants from the foreign type. Bright American flowers give color but are subsidiary to the general scheme of design. The orange house, which is considered the necessary adjunct of the garden in the cooler parts of northern Italy, provides not only the necessary winter storehouse here but adds to the picture. The garden sculpture is supplied by two light and graceful fountain figures by the late Bela Pratt, placed at the heads of the cascades on the terraces at either end of the garden.

Fountain Topped with Figure by Bela Pratt

The pink American marble out of which the balustrades, basins, steps and columns are made is more beautiful in color and in texture than the *pietra serena* of Tuscany. The absence of crumbling and forlorn garden ornaments, which seem in this country to be considered a necessary accompaniment of the Italian garden, is to be noted, for there are no antiques used. The search has been for beauty, and character has come with it in the frank utilizing of available domestic materials and planting appropriate to the garden season of this latitude.



Plan of Grounds
Showing Location of Garden
and Approach to House



LAGOON LOOKING TOWARD ORANGERY

GARDEN AT GROTON, CONN.

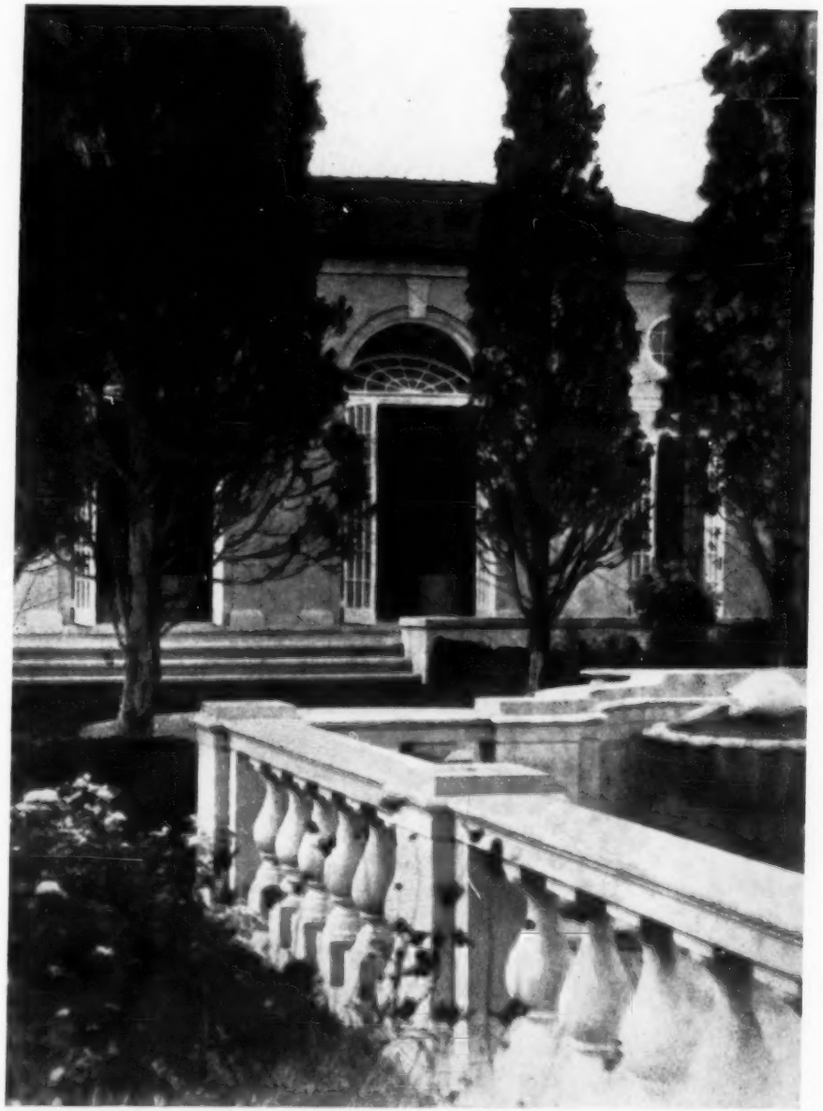
GUY LOWELL AND A. R. SARGENT, ASSOCIATED LANDSCAPE ARCHITECTS

LOWER BASIN OF CASCADE

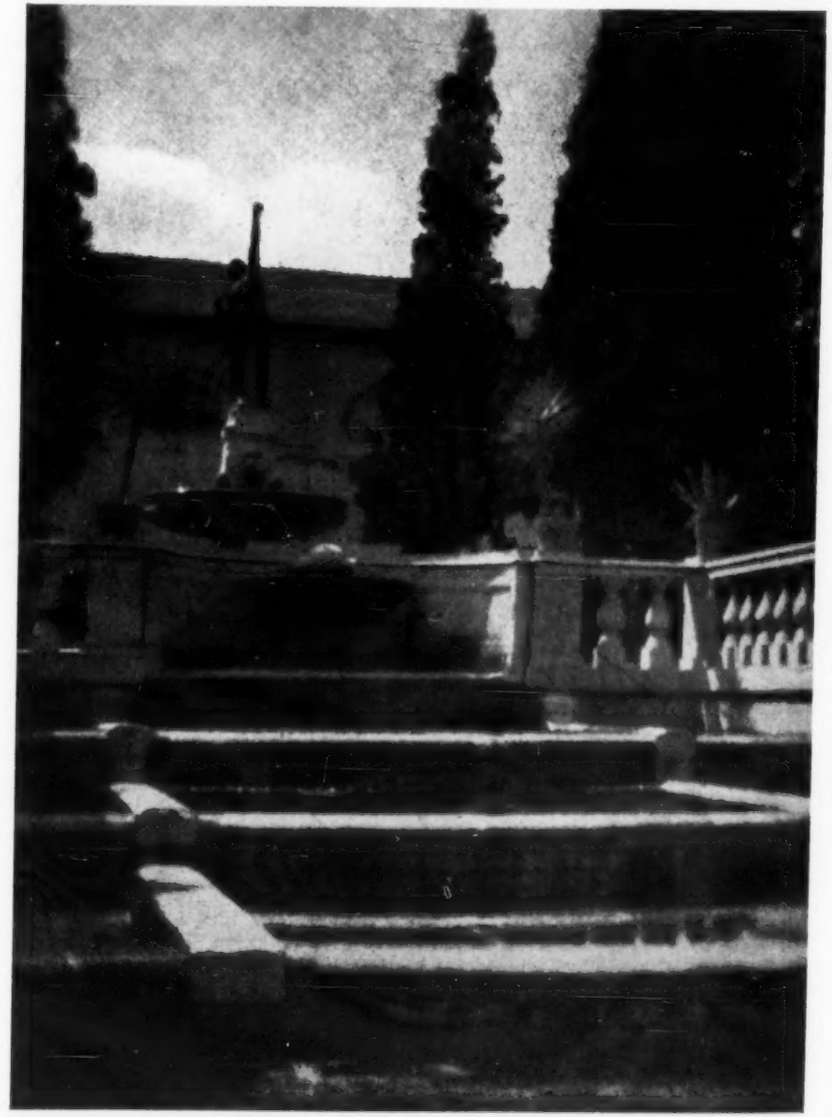
PARRON ON SOUTH SIDE

GARDEN AT GROTON, CONN.

GUY LOWELL AND A. R. SARGENT, ASSOCIATED LANDSCAPE ARCHITECTS



BALUSTRADE AND ORANGERY



FOUNTAIN IN FRONT OF ORANGERY

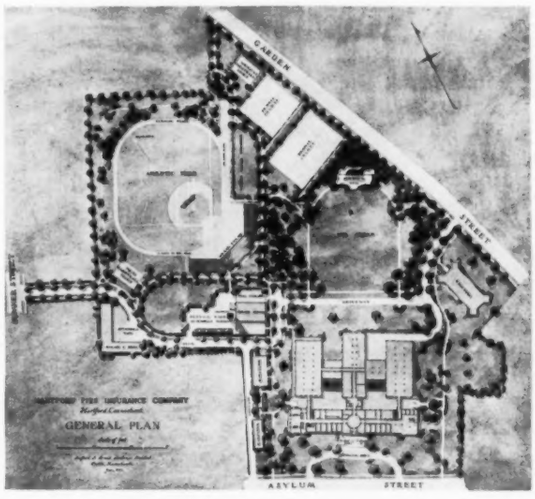
GARDEN AT GROTON, CONN.

GUY LOWELL AND A. R. SARGENT, ASSOCIATED LANDSCAPE ARCHITECTS

The Hartford Fire Insurance Building, Hartford, Conn.

EDWIN SHERRILL DODGE AND PARKER, THOMAS & RICE, ARCHITECTS
SHEFFIELD A. ARNOLD, LANDSCAPE ARCHITECT

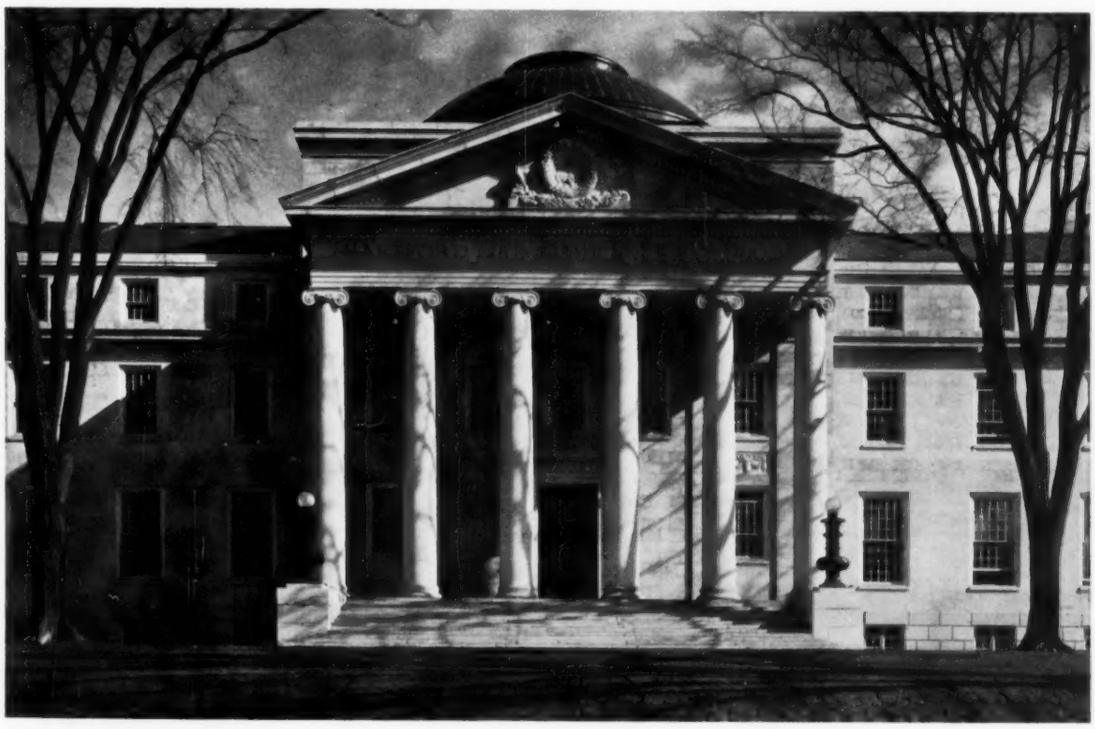
THE part in the success of a building project that an architect may well play in addition to his usual service in the design of the building and supervision of its construction is seen in the instance of the new home office of the Hartford Fire Insurance Company. The vital and creative part of the architect's service lies in his solution of the client's problem, based on the particular requirements the client names. Usually the client approaches the architect with a fairly definite idea of what he thinks is wanted, and in many of these cases that is accepted as the scheme with but slight modifications by the architect. It is questionable if this policy produces the best work. The client is likely to be influenced by what has previously been done, and he is furthermore often prevented from seeing his problem in clear perspective because of being too close to it.



General Plan of Plot Development
Sheffield A. Arnold, Landscape Architect

Hartford is known throughout the country as an insurance center. One of the most pressing problems of the large insurance companies located there is to obtain sufficient help of the type they require. This becomes an important element of consideration in the design of a building, because other things being equal the company that offers the most attractive physical conditions of employment has a direct advantage.

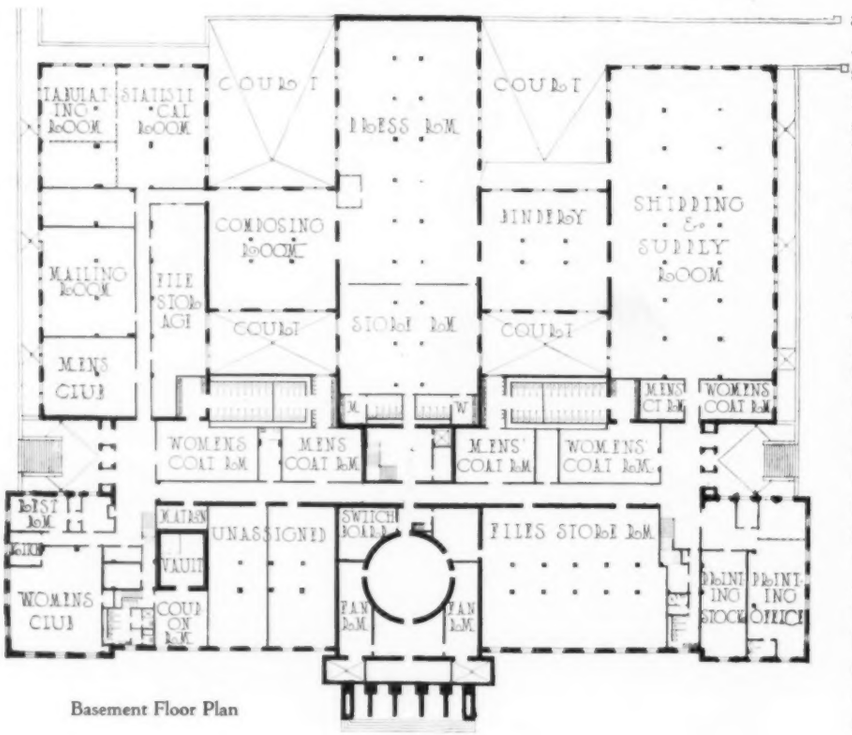
The officers of the company in their preliminaries to building had conceived a tall commercial structure in the center of the city, to be made individual



Elevation View of Entrance Portico

Claims, Inspection and Liability Office on First Floor

and acquire a publicity value through the construction of a tower, much after the manner of the Travelers Insurance Company building. In analyzing their problem Mr. Dodge was convinced that a building of quite different character, located in a less congested section with ample ground space for the provision of athletic and community features, would better meet the conditions. This plan was accepted and a distinctive building has resulted which is a monument to the insurance company and a source of great pleasure to its hundreds of employes. Mr. Dodge was impressed with the fact that this building should differ from the average commercial office building and that every means should be taken to secure a building that would age gracefully and that would increase in value as a business monument as the years went on. His architectural scheme was influenced by that masterly composition of Bulfinch's, the Massachusetts General Hospital in Boston. This building today makes a vivid impression on the visitor, and no small part of this impression results from the exterior materials—granite of fine texture, and marble for carved ornament that acquires with years a surface color similar to the granite. Investigation of the exact stone used in the hospital building disclosed the fact that through lack of production facilities or other causes, the same stone could not be had, but quarries in the same vicinities were able to meet the demand, and the walls of the Hartford building have in all major respects material that will age as beautifully as that in the walls of Bulfinch's famous Boston building.

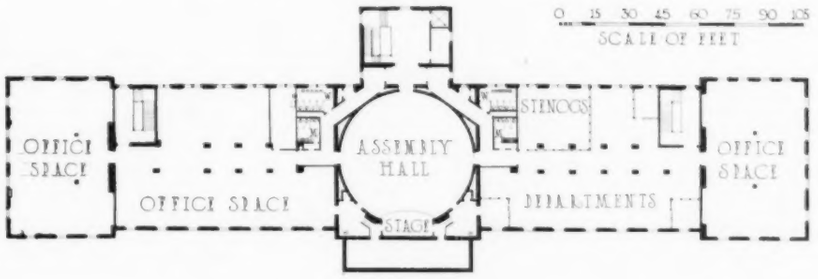


Basement Floor Plan

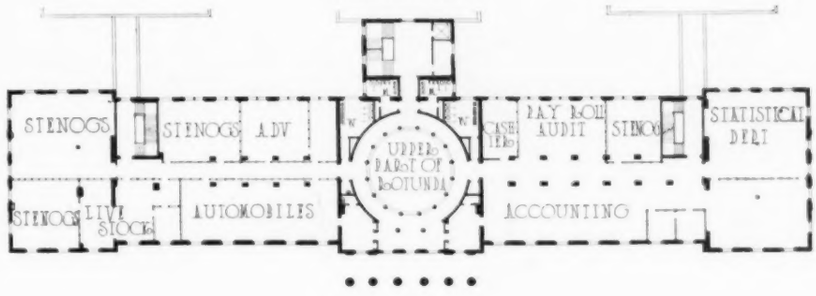
The building is located on a plot of about 20 acres on Asylum street, formerly the site of the American School for the Deaf. With great space available, the main building has been designed 360 feet long and three stories and basement in height. A portico supported by six monolithic granite columns 33 feet high marks the main entrance, over which is placed a low dome. The pediment bears the coat of arms of the company, with the familiar stag, while the company's name is inscribed upon the entablature. The plan of the structure is E-shaped with a central rotunda running through two stories, the space upon the third floor, under the dome, being occupied by an assembly hall 60 feet in diameter, with stage and anterooms.

The main entrance is into a vestibule from which open the offices of the porters. Just beyond is the rotunda, the upper story of which is supported upon columns behind which there extends an ambulatory, Hauteville marble being used for the walls and columns of the rotunda and the same marble combined with black Belgian for the floor. Doorways at each side of the rotunda open into the respective quarters of the Hartford Fire Insurance Company and its subsidiary the Hartford Accident and Indemnity Company. The offices of the president and chairman of the board of directors and the directors' room are at the far end of one of these wings and carry out in their design and decoration the dignity suggested by the exterior of the building, the offices of the president and the chairman of the board having chimneypieces and base courses of green Tinos marble, while in the directors' room antique cream marble is used, and the walls are paneled from floor to ceiling, the paneling affording a background for portraits of former officers of the company. The plans of this floor indicate the completeness of their equipment, special attention being drawn to the Eastern underwriting room and the Accident and Indemnity office, each of which is 75 x 100 and 20 feet in height, lighted both from the sides and from sawtooth skylights in the ceiling and floored with linoleum applied to the cement flooring.

A well equipped printery and bindery, complete with composing and press rooms, supply, shipping and delivery departments adequate for the printing of policies and reports, is a feature of the basement. One corner of the basement, reached by its own entrance from the outside, is planned as club rooms for the company's employes. Outdoor provisions for the employes include baseball diamond, five tennis courts, two basketball courts, and a garage with dressing rooms and lockers in the basement.

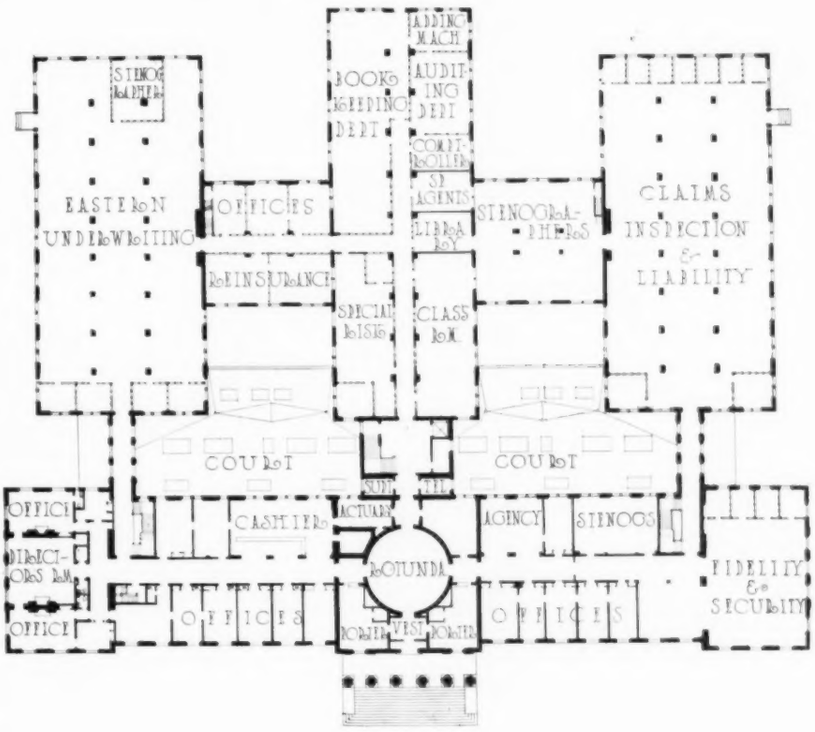


Third Floor Plan

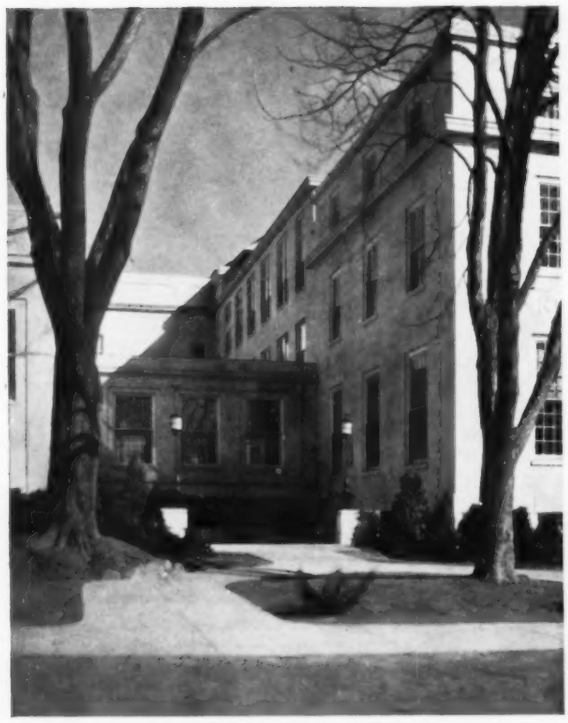


Second Floor Plan

In a separate power-house building are the boilers which supply steam for heating as well as a refrigerating plant where water is cooled and pumped to various drinking fountains. Fresh air is circulated by four large ventilating blowers at room temperature and automatically regulated by a thermostat. The piping from the power-house to



First Floor Plan



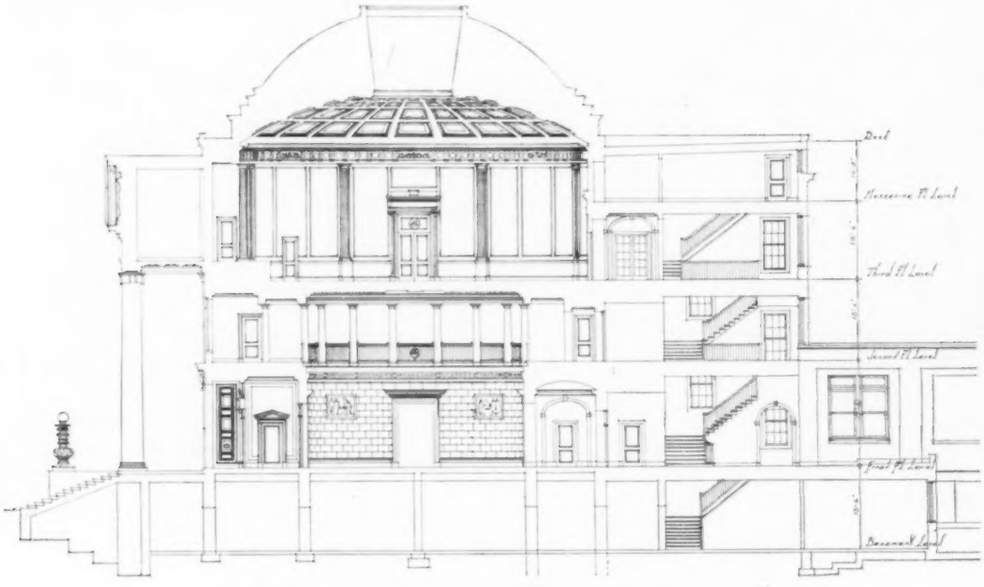
Employes' Basement Entrance

Corridor Looking into Cashiers' Space

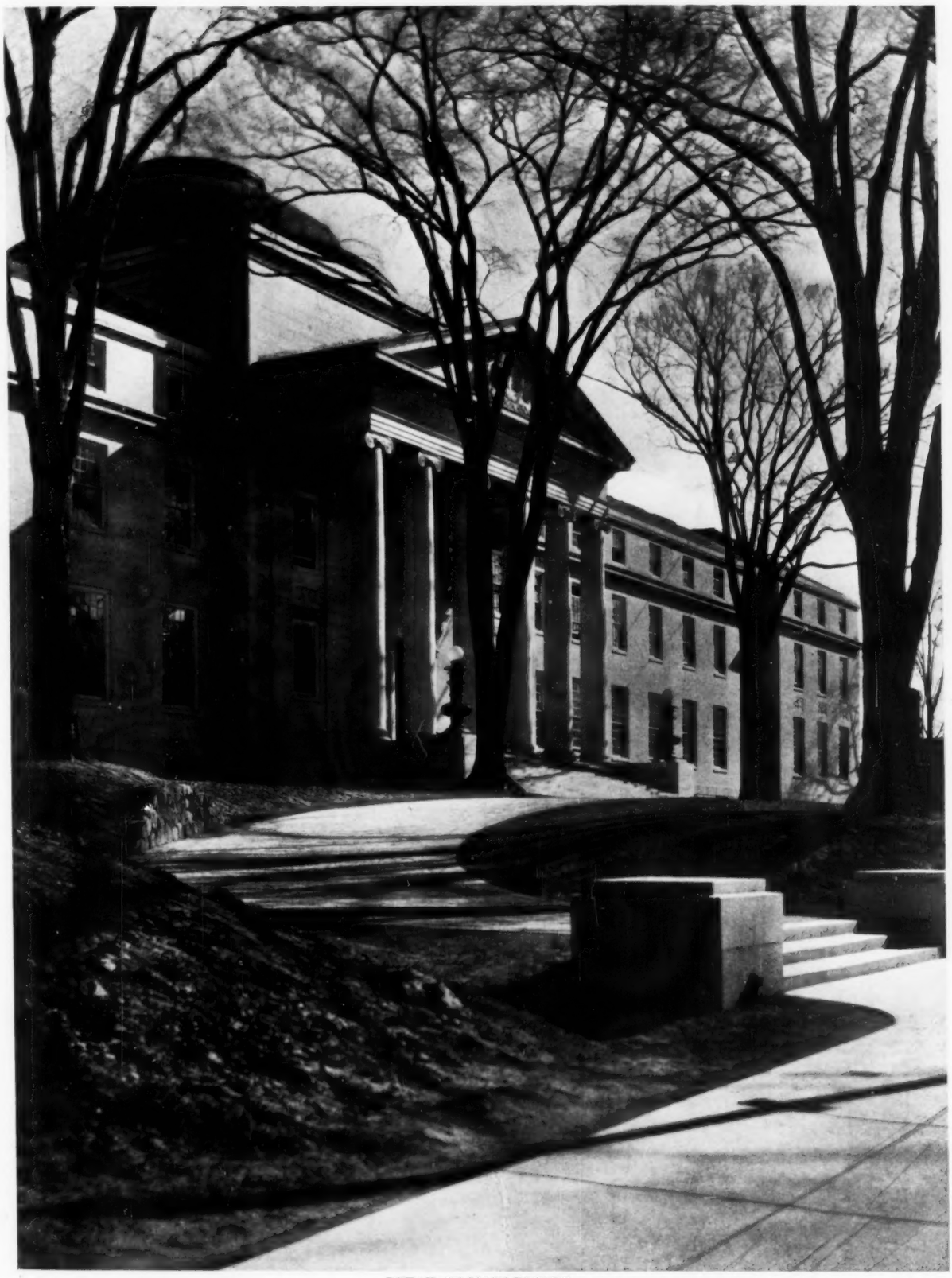
the main building runs in a concrete tunnel which is always accessible for inspection and repairs. Mechanical equipment throughout the buildings is arranged, as far as possible, to make all the focal points of possible trouble immediately accessible.

As might be supposed, the buildings of this great insurance company are fireproof throughout; there is nothing to burn, from basement to roof as far as the structure is concerned, and even the desks and filing cabinets are of steel construction.

The unusual nature of the building site demanded a treatment of the grounds in keeping, and the surroundings resemble those of a large and tastefully planned country estate. The most attractive feature of the grounds is the "green" at the rear of the main building on Garden street which is on a direct line with the central axis of the structure, the vista from the building being ended by a pergola.



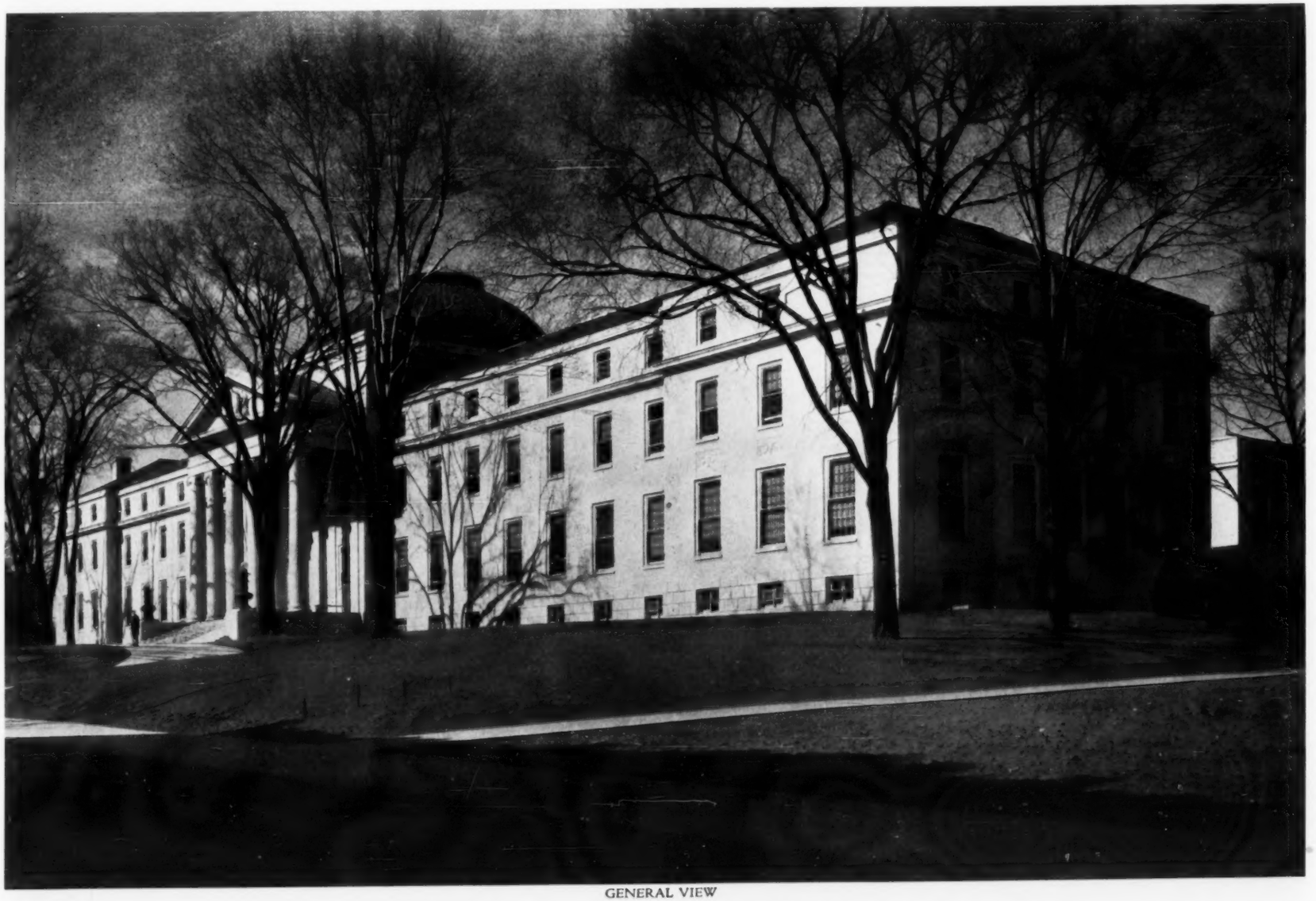
Cross Section through Main Building on Principal Axis



DETAIL OF MAIN FACADE

HARTFORD FIRE INSURANCE BUILDING, HARTFORD, CONN.

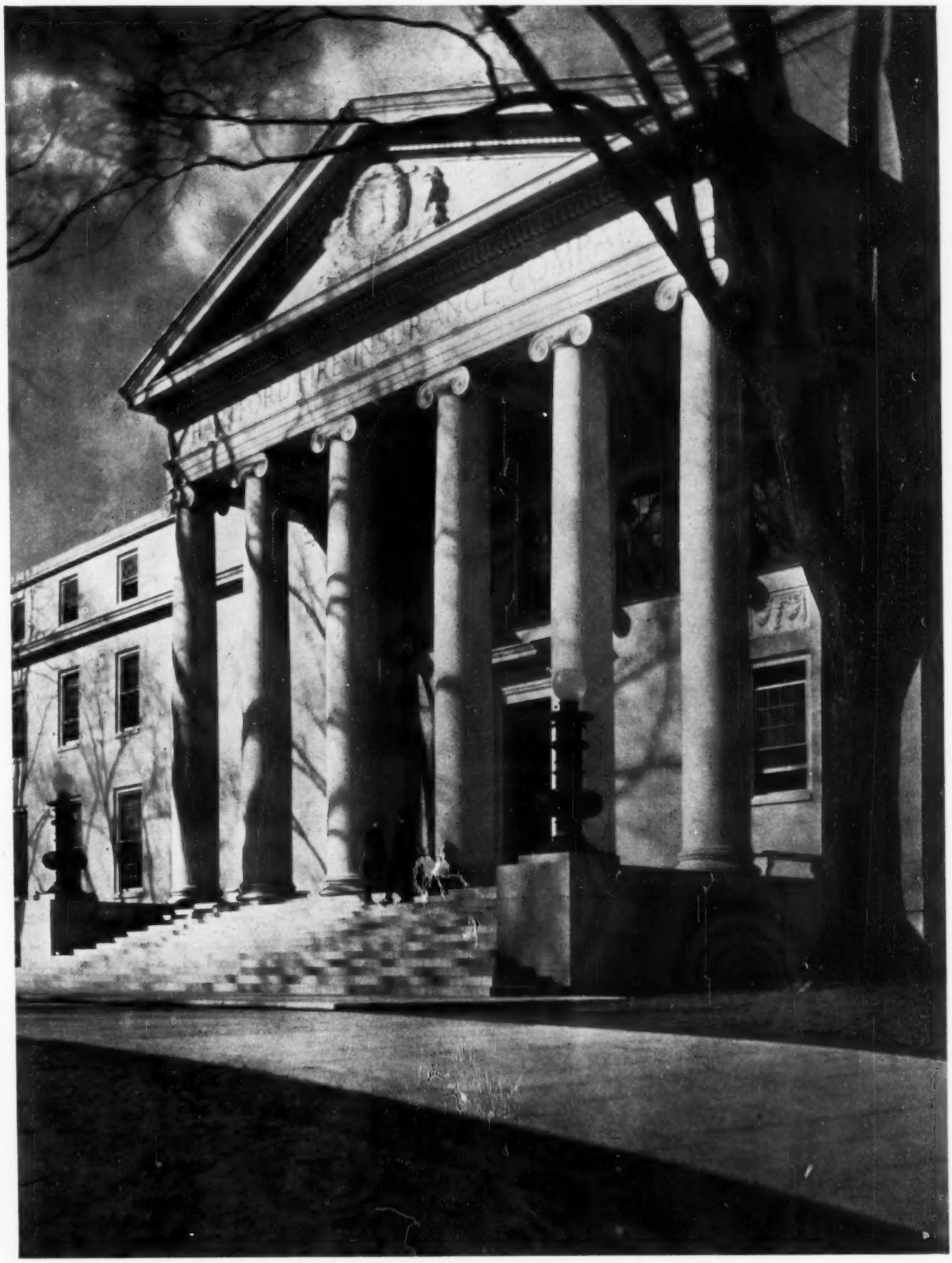
EDWIN SHERRILL DODGE AND PARKER, THOMAS & RICE, ARCHITECTS



GENERAL VIEW

HARTFORD FIRE INSURANCE BUILDING, HARTFORD, CONN.

EDWIN SHERRILL DODGE AND PARKER, THOMAS & RICE, ARCHITECTS



ENTRANCE PORTICO

HARTFORD FIRE INSURANCE BUILDING, HARTFORD, CONN.

EDWIN SHERRILL DODGE AND PARKER, THOMAS & RICE, ARCHITECTS

DETAIL OF PORTICO

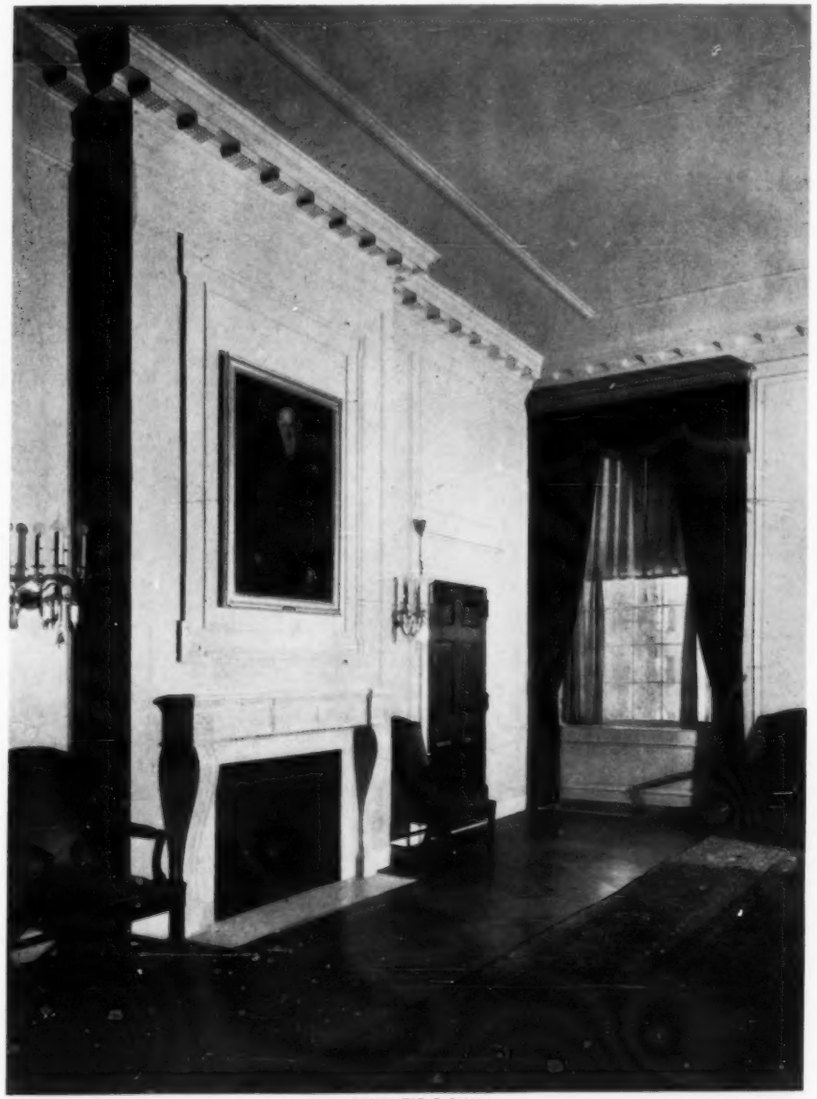
HARTFORD FIRE INSURANCE BUILDING, HARTFORD, CONN.

EDWIN SHERRILL DODGE AND PARKER, THOMAS & RICE, ARCHITECTS

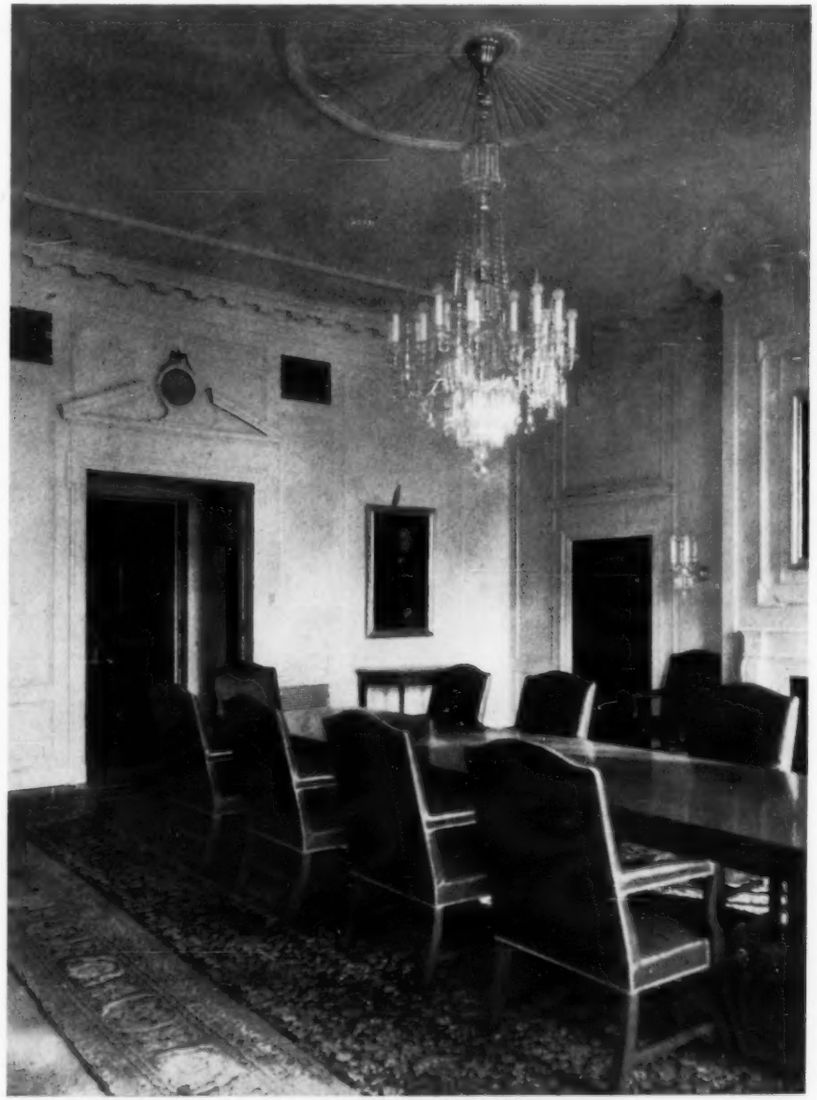
ROTUNDA

HARTFORD FIRE INSURANCE BUILDING, HARTFORD, CONN.

EDWIN SHERRILL DODGE AND PARKER, THOMAS & RICE, ARCHITECTS



PRESIDENT'S ROOM



DIRECTORS' ROOM

HARTFORD FIRE INSURANCE BUILDING, HARTFORD, CONN.

EDWIN SHERRILL DODGE AND PARKER, THOMAS & RICE, ARCHITECTS

BUSINESS & FINANCE

C. Stanley Taylor, *Associate Editor*

The Architect's Agreements With the Owner

PART II. SPECIAL FEATURES OF AGREEMENTS WHICH SHOULD RECEIVE CAREFUL CONSIDERATION

IN the first part of this article published in the May, 1922 issue of THE FORUM, consideration was given to the establishment of a proper business understanding between the architect and his client regarding the scope of service to be rendered and the amount and method of payment.

In this concluding section there are presented several important points on which misunderstanding may arise between the architect and his client. Suggestions are made showing how these questions have been successfully covered in various forms of agreement.

A careful study of the points set forth in this and the preceding part will serve to indicate clearly the important basic considerations which may be expected as part of the problem of client relationship.

THE question of the abandonment or suspension of a proposed building project is one which is of particular interest and importance to the architect. Where a building project is abandoned during any stage of planning, there is often a disagreement between the architect and the owner as to the equitable settlement of the service fee. We present clauses covering this subject, which have been selected from various typical contracts:

If the erection of the building is suspended or abandoned, our compensation for work already finished shall be as follows:

Of total compensation—

Should preliminary studies alone have been made, TWO–TENTHS (2/10);

Should preliminary studies, general drawings and specifications have been made, FIVE–TENTHS (5/10);

Should preliminary studies, general drawings, specifications and details have been made, SEVEN–TENTHS (7/10); and such compensation shall become at once due and payable.

Should the work be abandoned before drawings, specifications and details have progressed sufficiently far to make it possible to take definite bids from contractors so that the cost may be known, commission for partial payment is to be reckoned on an approximate cost of..... Should actual estimates have been received, then the compensation shall be based upon the lowest responsible estimate so received.

Another method is thus indicated:

If the construction or completion of the building should be suspended, abandoned or unreasonably postponed, or if, after paying the architect a sum equal to one and one-fifth per cent (1-1/5%) upon the estimated cost of the work, the owner should for any substantial cause decide to sever his relation with the architect, he may, by resolution, terminate this contract; then in either of the above cases, the owner shall pay the architect such fees, reimbursements and compensations as shall be payable under this agreement for the work done, and such part of any further payment as the work done bears to the whole work required to be done to entitle the architect to such further payment, plus an amount equal to one per cent of the cost or estimated cost of the building, in lieu of any prospective profits, and as liquidated damages for any loss sustained by termination of this contract, and such sums so paid shall be in full discharge and satisfaction of all liability of the owner under this agreement; provided that in the case of a resumption of work to be determined upon, the owner may, by resolution, resume his relations with the architect under this contract, and in such event all payments previously made shall be held to be payments on account of the architect's total fee and compensation.

Another method:

After the work has proceeded on the drawings and it is decided to abandon the erection of the proposed buildings for causes beyond our control, our charges for the work done at the time the project is abandoned will be based on the minimum charges of the American Institute of Architects, as follows:

Upon completion of preliminary studies ONE–FIFTH (1/5) of the entire fee.

Upon completion of specifications and general working drawings, exclusive of details, TWO–FIFTHS (2/5) additional, making a total of THREE–FIFTHS (3/5) of the entire fee. Until an actual bid is received, charges to be based upon the estimated cost of the work.

If after bids are received and it is decided for any reason to delay starting erecting the building for a period exceeding two (2) months, we are to receive two (2%) per cent of the cost of the work as a payment on account and the additional one (1%) per cent to be paid when work is started.

Another question is that of additional charges. Here are selected clauses covering this point:

First clause:

An additional charge shall be made for alterations or additions in plans after the plans have been approved by you; this charge will be valued in proportion to the additional time or services employed This provision shall not apply to any such alterations or additions made necessary by reason of errors, defects or incompleteness in the drawings, specifications and details furnished by us.

Alternative:

When for any reason the owner shall request the architect to make material alterations in or modifications of the working or detail drawings, after the acceptance of the "Preliminary Working Drawings" or request him to prepare studies, drawings or specifications for work not contemplated by the preliminary working drawings, the owner shall reimburse the architect the actual cost of drafting and specification writing plus seventy-five (75%) per cent thereof for general office expenses, commonly called "overhead," and shall pay the architect a fair and reasonable profit for his services in connection therewith.

Alternative:

That, if after a definite scheme for the said building has been approved, the owner makes a decision, which for its proper execution involves extra services and expense for changes in or additions to the drawings, specifications or

other documents, or, if the architect is put to further labor or expense by delays caused by the owner or a contractor, or by the delinquency or insolvency of either, or as a result of damage to the construction work by fire or other unforeseen calamities, then such additional extra services and expense shall be paid by the owner at the same rates and the maximum amount therein stipulated shall be increased accordingly.

The question of architectural supervision is one which is at best confusing to the average client. It is not often clearly understood by the client that architectural supervision does not always mean a constant watch set upon contractors and material men to make certain that the required number of coats of paint are actually put on or that the specifications are followed out in exact detail. This can only be expected when a clerk of the works or an architectural superintendent is at all times on the ground—a competent man whose salary is paid by the owner.

Agreements covering this point of supervision should, therefore, be specific and purely understandable. In examining various contracts, we found that the clauses relative to actual supervision were as a rule vague and not clear as to the amount of time which the architect might be expected to employ under the service fee agreed upon. This clause shows how this condition was met in one contract:

We agree to superintend the performance of all labor and the installation of all materials in the construction of said building and see that all labor is properly performed and that all materials conform to contract specifications, and to promptly notify you of any delinquencies in either respect and to perform any duties in respect thereto that may be provided in any contract made by you with any contractor or material man.

We to have authority in construction emergencies to order necessary changes at your expense and with your approval and to stop the progress of any work or order its removal when not in accordance with the contract.

Our representative will make visits to..... for the purpose of consultation during the preparation of drawings and for the purpose of letting general contract, and at least.....visits for the purpose of general superintendence; should it be necessary or deemed advisable by you for us to visit the building more frequently, we will set the sum of.....per day for such additional visits.

The employment of a clerk of the works and of engineers for special services should be clearly understood, together with the fact that their proposed compensation is a direct charge to the owner and not part of the architect's fee. Thus we have clauses similar to the following:

The architect is to nominate the clerk of the works and the engineers for the acoustical work, the heating, ventilating, mechanical and electrical systems of the building, and their proposed compensation having been approved by the owner, the architect is by and with the consent of the owner to appoint them.

As the form of contracts will naturally vary in accordance with the type and size of the proposed building (and the extent of service offered by the architect's organization), we quote a few special clauses which indicate points that from time to time will prove of importance:

Agency and agent liability clause:

In all transactions between yourself and contractors upon the work, we are to act as your agents, and all prices, rebates, charges and commissions procurable by us from any contractor or material man shall insure to your benefit. Our duties and liabilities in this connection are to be those of agents only. The amount of our liability shall in no case exceed the total architect's commission.

Preliminary drawings:

Owing to the requirements for enlarged facilities arising after the approval of the preliminary drawings, certain revisions in the general scheme have been deemed necessary by the owner, and the architect has been, and is engaged, in the completion of what are herein termed "Preliminary Working Drawings." These drawings, at 1/8" scale to the foot, and consisting of plans and sections which will fix more accurately than is possible in the 1/16" scale preliminary drawings and general dimensions, close approximate seating capacities and general layout of interior partitions, are to be submitted within a reasonable time for owner's further approval. It is understood that these preliminary working drawings so approved shall then become the basis upon which the working drawings and specifications shall be formulated by the architect.

The various points brought out in the foregoing discussion are those which constitute the more ordinary sources of disagreement between the architect and his client. It is evident from an analysis of contracts that any unusual condition of service should not be left merely in the form of a verbal agreement but should be reduced to a specific contract clause or a specific paragraph in the letter of agreement. Attorneys who have had considerable experience in connection with litigation covering service claims of architects inform us that it is difficult to get proper recognition or a fair understanding on the part of a jury as to the actual work which the architect does. Invariably this work appears in the form of court exhibits consisting of drawings and specifications. These exhibits do not indicate the great amount of time and experience involved, nor are they impressive when a jury fixes the amount which the architect is entitled to. It is, therefore, apparent that the wise procedure for an architect is to employ legal service for the purpose of avoiding trouble in preference to the forced employment of attorneys to present claims for service fees or to defend the architect in cases where the owner seeks to place upon him liability for damages in the form of excess costs or structural conditions and defects not fairly chargeable to the architect.

It must be realized that the architect accepts a heavy business responsibility when he undertakes to expend the owner's money in the construction and equipment of a building. This is the difference between the professional service of an architect and practically all other forms of professional service—*that the architect actually accepts the responsibility of spending his client's money.* Few other professional services include this feature. For this reason the architect cannot safely assume as a professional attitude that he has no interest in the legal soundness of the contractual relationship into which he enters when he accepts a commission to design and supervise the construction of a building of any type.

The Present Aspects of the Building Situation

PERHAPS at no time in the history of building construction in the United States has there been so much interest displayed on the part of prospective building investors in regard to actual conditions in the building field and the possibilities of the near future. One of the important functions of service which the architect is called upon to render is that of providing general information and advice to his clients in regard to building costs and conditions. This is a condition which is becoming more definite as the architect's position as a giver of service in the economic scale becomes more firmly established. Conversely, it may be said that the security of the architect's position is becoming more and more dependent upon his ability to render service of an advisory business nature as well as to provide building designs of æsthetic and practical merit.

There are certain outstanding features of the building situation today which will have a direct bearing upon the attitude and mind of clients who have not yet fully decided to proceed with building operations. Other facts are pertinent to the architects themselves, as they show an increase of activity in many of the offices throughout the country and form some basis of anticipating future conditions. Perhaps the most interesting basic fact for consideration is that of the unusual building activity which has developed in the months of March, April and May. Referring for a moment to the chart shown on the first page of the Service Section in this issue of THE ARCHITECTURAL FORUM, it will be seen that there has been an unusual increase in the volume of building construction during the months of March and April. Analyzing this increase of activity it is found that the month of April shows a volume of new construction in the form of contracts let about 20 per cent greater than in March. An increase is shown in all classes of construction excepting industrial building which shows approximately equal activity in two months. The outstanding classes of building construction, where increased interest in activity is indicated, include residential building, which constitutes about 40 per cent of all activity, business buildings, educational buildings, institutional buildings (hospitals, churches, etc.), public buildings and industrial buildings.

At the present time attention is focused principally upon the volume of residential construction. As predicted many months ago, the first definite revival of construction activity has been in classes of buildings to meet residential demand and to provide community facilities for newly developed or growing residential sections. The recent reports of building activity have, therefore, been based to a great extent on activity in the residential field and many architects noting the volume of construction have wondered why their practice has not increased in proportion to this reported building activity. A brief study of the classes of buildings which constitute this volume of residential construction provides an immediate answer to this question. A very large percentage of the volume of new contracts in the residential field is made up of small individual houses, developed from stock plans and through speculative builders in a manner which does not call for much architectural service. Another contribution to this large volume of construction has been through the medium of the speculative construction of multi-family dwellings (built without much thought of architectural service) in connection with a haphazard speculative building program designed to make profit out of the housing shortage situation.

This condition has resulted in the construction of a great many speculative apartment buildings which have sold rapidly to investors on a basis of high rentals and quick profits. This type of construction has been a great drain on the building material stocks of the country, but it has now reached the point where in many parts of the country the shortage of medium-priced apartments and small houses has been met almost to a point of saturation. We have been informed through reliable sources that in the residential district of Chicago on May 1 of this year there were probably ten thousand vacant apartments, and we know that in many districts apartment rentals have dropped fully 25 per cent. We believe that this point is being approached also in New York, and that by the fall of the year there will be much less activity in the building of poorly designed and constructed housing operations. In fact this prediction will probably apply to much of the multi-family housing coming within the scale of moderate rentals.

Just before writing this article we discussed this question with Walter Stabler, Comptroller of the Metropolitan Life Insurance Co., and learned with interest that this organization, which represents the greatest single loaning institution in the United States, is making no more commitments for the financing of medium-grade apartment houses in and around New York.

The Housing Program of the Metropolitan Life Insurance Co.

This discussion would not be complete without some reference to the broadly heralded effort of the Metropolitan Life Insurance Co. toward the stabilization of low-cost, multi-family housing to meet the needs of families requiring apartments on a low rental basis. Some months ago it was proposed that the New York state legislature grant to insurance companies the right to actually build and own apartment buildings and other types of housing for the purpose of assisting in alleviating the housing shortage for New York. The Metropolitan

Life Insurance Co., under the right conditions, agreed to undertake an important part of this program by actually building up to one hundred million dollars' worth of moderate cost apartment buildings.

Authority was recently granted by the state legislature for carrying out this program and interest immediately focused on the final decision of the Metropolitan Life Insurance Co. and the actual program which it might carry out. It was proposed that this operation should represent the building of a large number of low-cost, multi-family buildings in which apartments would rent at an average of $9 per room per month in vicinities where the average rental is $15 per room per month. This great insurance organization, having millions of policy holders among families of moderate income, has already contributed to alleviating the building situation through the medium of loaning millions of dollars monthly on housing projects. Similarly the interest in actually providing a large number of moderate-cost apartments in New York is not as a speculative real estate investment but as a definite attempt to bring down rentals for families which cannot afford to pay the rentals demanded in poorly constructed speculative building operations and under the conditions of rentals which have in many cases been raised disproportionately under the demand of housing shortage.

With this praiseworthy objective in view and having removed any possible legal objections to the operation, we understand that the actual condition of this project today is that the Metropolitan Life Insurance Co. is ready to go ahead with the construction of fifty 32-family houses, built in two operations in the Long Island City and Astoria sections of New York, provided they are able to have structures of this nature so efficiently designed that the contract figures will insure the provision of $9 per room rentals which must provide for the maintenance of the building, pay 6 per cent interest on the investment of the insurance company, and provide 5 per cent per year to amortize this investment. Andrew J. Thomas of New York has been retained as architect to provide the necessary plans which are now about completed. A number of contractors are being asked to bid on the work, and if the Metropolitan Life Insurance Co. can be assured by these plans and figures that the project will meet the requirements outlined, this great operation will proceed immediately.

Undoubtedly, many objectionable types of building operation will be eliminated as rentals become stabilized through the controlling influence of large financial organizations and through such practical contributions to the housing situation as that described. This condition, however, will be of direct benefit to the building construction industry and is already tending to divert activity in the field of better class building construction, a condition greatly to be desired by those interested in economic progress. It is evident that to a certain extent construction activity around New York is to be slowed up temporarily by a shortage of building materials. Brick and lumber prices in the local fields have already shown a tendency to strengthen considerably, and labor conditions are not good.

With all these facts in mind, it will be seen that we have passed the crest of the first wave of building activity represented by speculative development. We are now entering the second and sounder period wherein better types of buildings will be constructed, and there will be much more activity in architectural offices. The great flow of building materials into the speculative phase of this period of activity is to be diverted toward the construction of better types of housing and the provision of a great number of educational and institutional buildings, public buildings and business buildings. We are now constantly receiving reports of a favorable reaction in architects' offices. A number of good projects which have been buried in plan form for several years are being brought to light and made ready for actual construction. The shortage of building materials which is evident at some points will soon be offset by the greatly increased production activity which is to be noted at the plants of many building material manufacturers. The desire and tendency of the average material manufacturer today are not to raise prices under the present reaction but to develop a large volume of sales at prices made as reasonable as possible under the governing conditions of production. It is quite evident that a period of moderate prosperity may be anticipated, not only in the building industry but affecting all commodity markets, provided a definite effort is made to keep down prices and to eliminate the element of profiteering which often intrudes disastrously at the beginning of a period of sound demand.

It is our prediction that the cost of building will, over a long period of years, decline gradually with here and there a brief increase as the volume of activity becomes unusually large. This is a logical prediction and indicates that the average building project may now be undertaken without fear of a too great decrease in reproduction value with the consequent shrinkage of investment and mortgage loan collateral. With the returning interest in the building field as an investment outlet, it is gratifying to know that the financial organizations which constitute channels for a large proportion of such mortgage bond investments by the public are invariably appreciative of the service of architects who have the ability to plan attractive and efficient buildings. Higher standards of design and architectural merit are being set by such loaning institutions than ever before. This fact is highly significant to the architectural profession and should prove the forerunner of an ultimate better understanding on the part of the building public as to the importance of the architect's contribution and responsibility toward both the æsthetic and economic success of the building of the future.

An Estate Development at Rye, New York

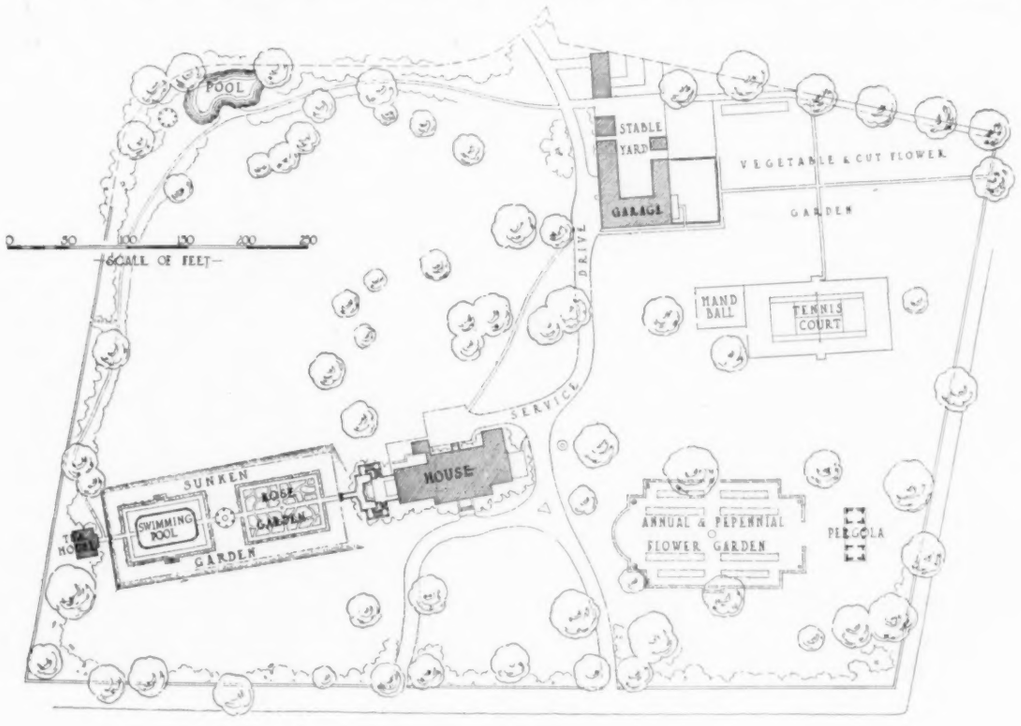
DWIGHT JAMES BAUM, ARCHITECT

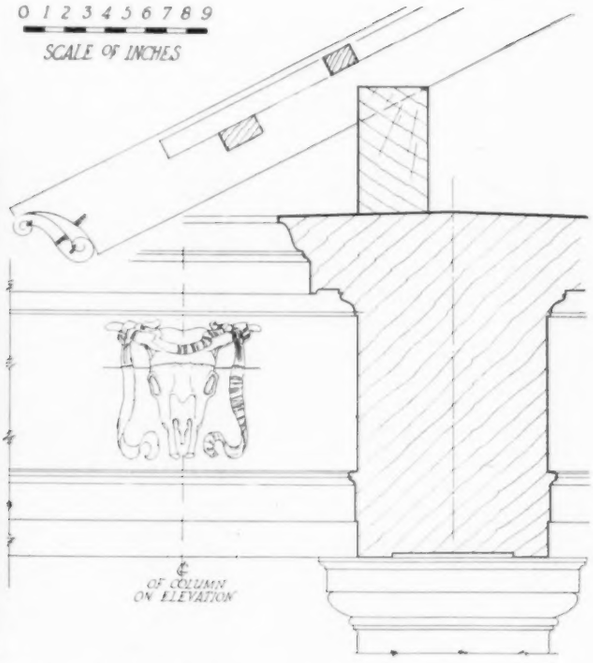
THE art of landscape design and gardening as a complement and ally to architecture is steadily being more appreciated by both architect and cultured layman. In domestic work especially the finest example of architecture is cold and forbidding without the intimate connection with its site and the sense of repose and age that a well considered planting scheme supplies. It is due to the intelligent co-operation of designers in these arts that we owe our large number of beautiful estates, for rarely is a site available that is favored with a natural growth of fine trees and shrubbery masses; the setting must be created quite as much as the architecture.

Antique Vase and Pedestal

A great part of the finished, well balanced appearance of the grounds and gardens of the Richard A. Rowland estate on the Boston post road at Rye, New York, is due to careful and well executed planning and the proper placing of large trees and shrubs rather than to years of natural growth on the site. When the commission was turned over to the architect there was no foliage whatever upon the long road frontage of the estate, none elsewhere on the tract and no trees excepting several large maples and a few pines. All the rest of the planting has been done within the period of a year and a half, including the moving of five maples of large size, sixty large evergreens and shrubbery of every description, the trees and much fully grown shrubbery having been purchased and moved from nearby estates to obtain an immediate effect at a minimum of cost.

In the planning of the grounds of this estate, which embraces ten acres, the natural disposition of the land which was quite low on both sides of the house dictated the principal scheme. At the left of the house as it is approached, and arranged on a prin-

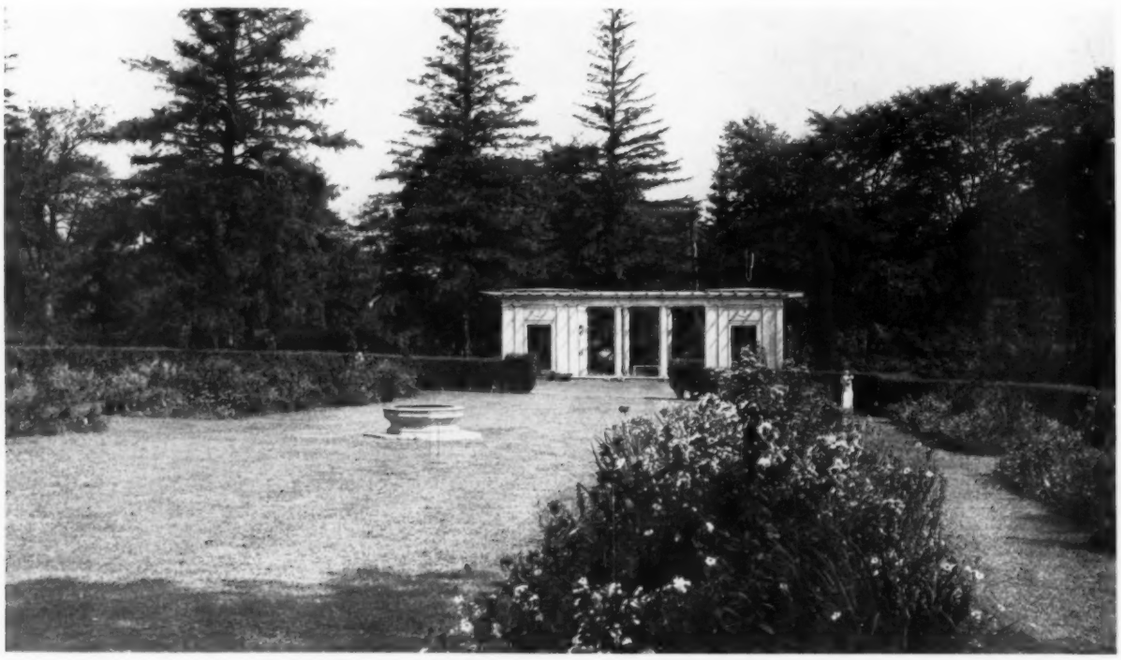




Details of Garden Temple at Center of Sunken Garden

cipal axis of the house, is the sunken garden with swimming pool and rose garden as the main features. This required some excavation and the earth thus obtained was employed to fill the space below and at the right of the house which had been an unattractive swamp. This space was arranged as a large flower garden surrounded by lawns that were carefully graded to secure a rolling surface, much as nature provides. In transforming this site of comparative irregularity, all filling was obtained within the confines of the estate. The whole tract was laid with underground drainage, and all spring and marsh water drained towards the lowest point where a naturalistic pool was built at small expense.

Accessory buildings are placed where they ter-

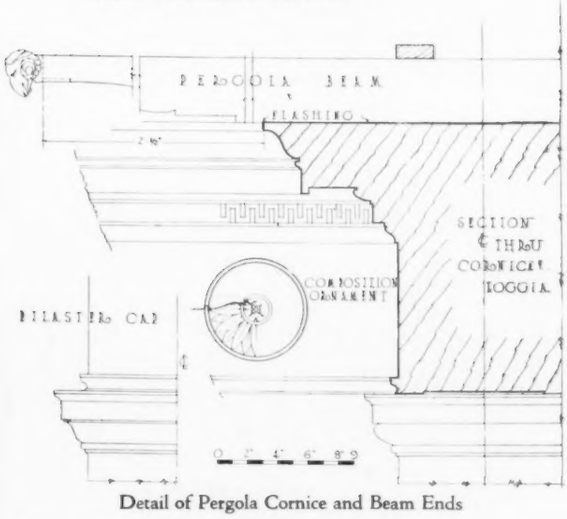


Flower Garden, Looking toward Pergola

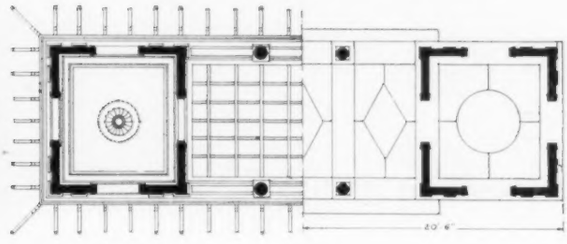
minate important vistas. At the far end of the flower garden and seen through an opening in the enclosing privet hedge is a pergola with a small room at each end which forms a shelter in wet weather and a pleasant place to sit on sunny days. Back of this pergola is set a hedge of French lilacs, 16 feet in height, placed so that at the time of year when they are in bloom their fragrance fills the pergola. The long vista from the opposite side of the house is through the sunken garden with a gazebo or temple at its center, across the swimming pool which is 50 feet in length, lined with blue faience tiles and edged with a granite coping, and closed by a graceful structure upon the axis of the vista, approached by travertine steps and doing service as a tea house. This little building includes two dressing rooms with showers and a machinery room from which the water in the swimming pool is kept in circulation and from which the pool is emptied and filled. From this tea house a walk extends along the edge of the property through a partly wooded section to the naturalistic pool to which, as already explained, the estate is drained of all spring water and excess of rainfall.

The tennis court which is set some dis-

Italian Well Head of Travertine



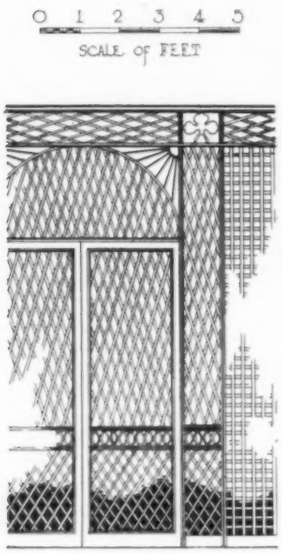
Detail of Pergola Cornice and Beam Ends



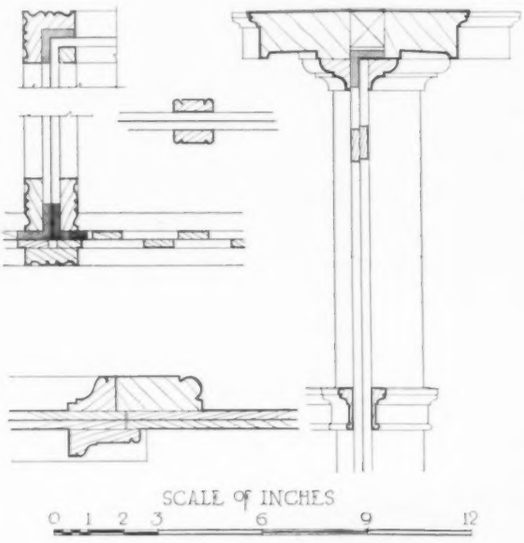
Detail and Plan of Pergola at End of Flower Garden

tance back of the flower garden on the right of the house is surrounded by a high screen of lattice work of architectural character; at one end of the tennis court is a smaller court planned for handball, and at each side of the tennis court is a small shelter with stone seats for spectators. About the base of the lattice screen there is a pleasing combination of deciduous and evergreen planting to relieve the rectangular lines of the court enclosure. Throughout the grounds various small features of architectural or decorative interest occur where they are least expected — an Italian well font, several pieces of garden sculpture, partially hidden among trees or shrubbery, and a bird bath at the center of the flower garden. The material in these features shows a texture of appropriate nature for the outdoors, and the robustness of form makes them attractive accessory notes to flowers and massed foliage.

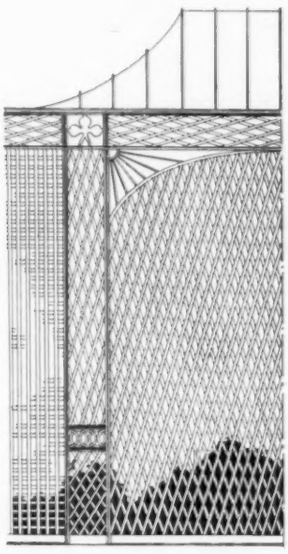
The entire estate is a well considered landscape treatment, in which architecture in classic vein and expansive open gardens are harmoniously combined. From a beginning of unfavorable conditions, a bare and somewhat swampy tract of land has been entirely transformed into the present attractive estate in the remarkably short time of less than a year and a half or about twelve months of actual work. With the more luxuriant growth a few years will bring and the ample scale of the gardens a place of unusual beauty will develop.



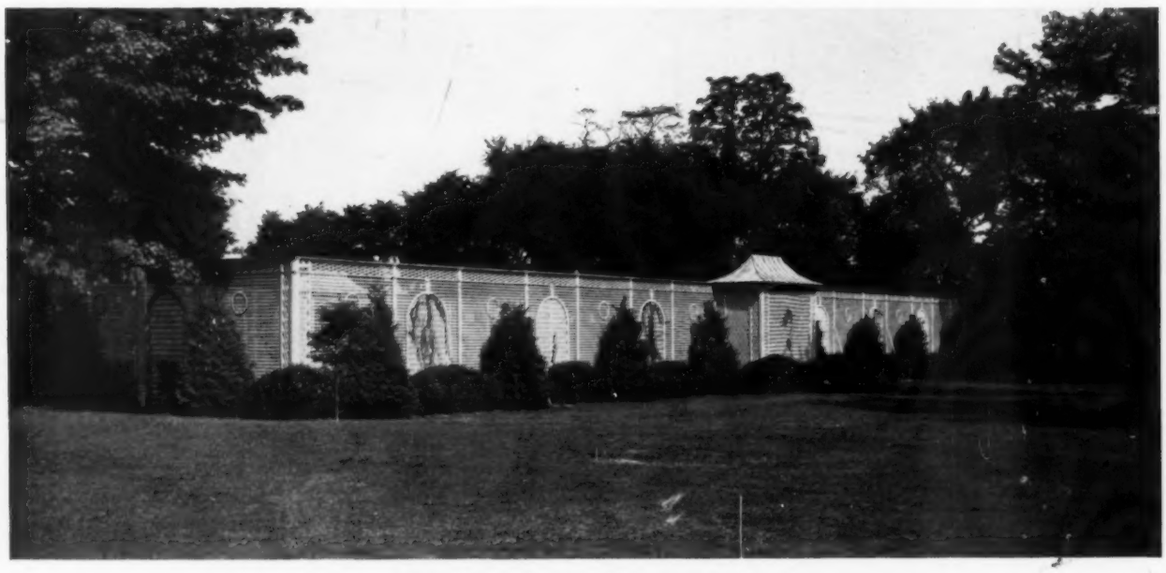
Detail of Doorway



Structural Details of Enclosure



Detail of Shelter



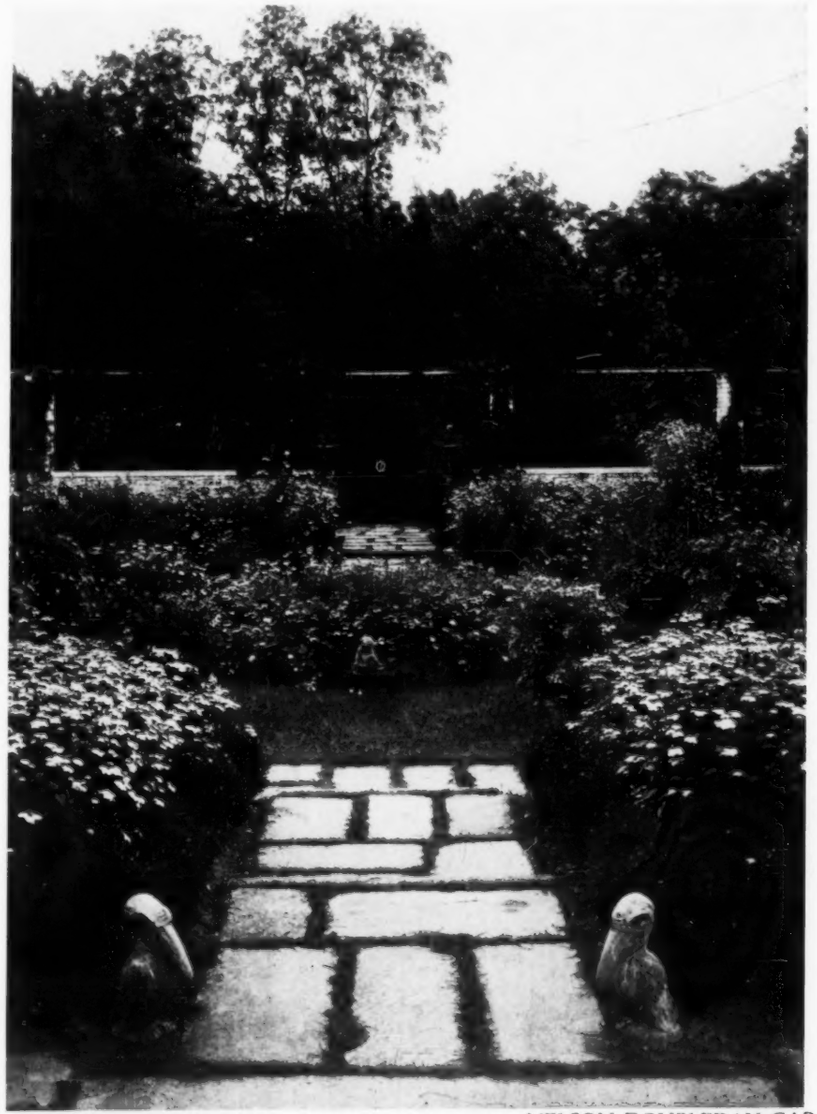
Exterior View of Lattice Tennis Court Enclosure

VIEW ON MAIN AXIS OF GARDEN

NELSON DOUBLEDAY GARDEN, OYSTER BAY, L. I.

OLMSTED BROTHERS, LANDSCAPE ARCHITECTS

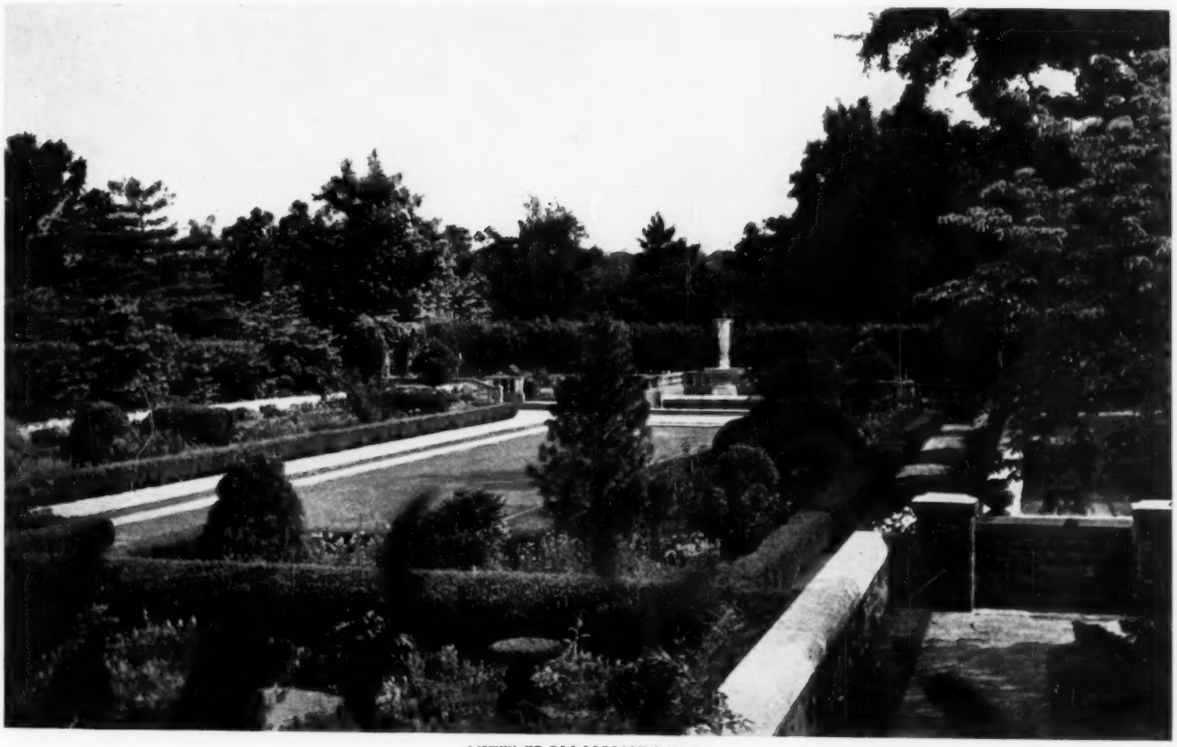
A house not rigidly stylistic has a minimum influence on the garden. Although intimately related to the house, there is a happy freedom from convention



NELSON DOUBLEDAY GARDEN, OYSTER BAY, L. I.

OLMSTED BROTHERS, LANDSCAPE ARCHITECTS

The simplicity of the flower masses and of the structural lines of the garden are particularly pleasing in their relation to the adjacent woods and as a setting for the house



VIEW FROM HOUSE LAWN

J. E. ALDRED GARDEN, LOCUST VALLEY, L. I.

OLMSTED BROTHERS, LANDSCAPE ARCHITECTS

Harmony in character between house and garden may usually be secured merely by the use of appropriate architectural details, garden ornaments and plant forms, and opportunity for variety, interest and distinction is still almost unlimited

GARDEN AT CLEVELAND

OLMSTED BROTHERS, LANDSCAPE ARCHITECTS

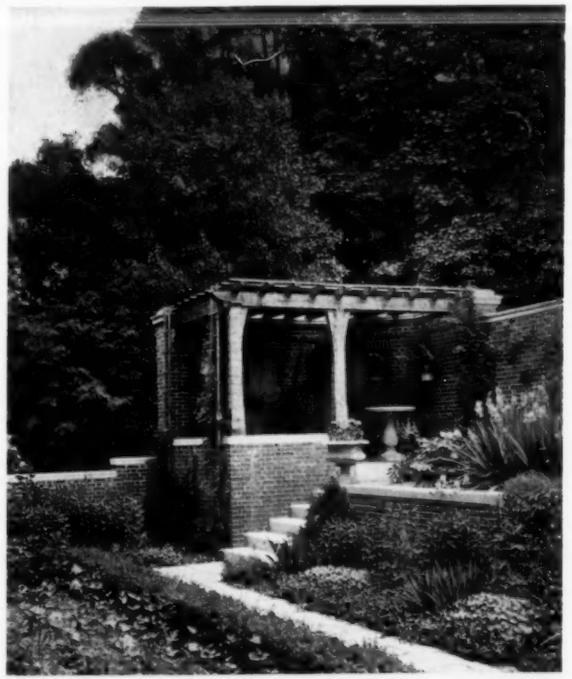
In a woodland ravine with planting and overhanging trees, it is a striking example of the utilization of opportunities afforded by the site. The intricate lights and shadows contribute largely to its peculiar charm

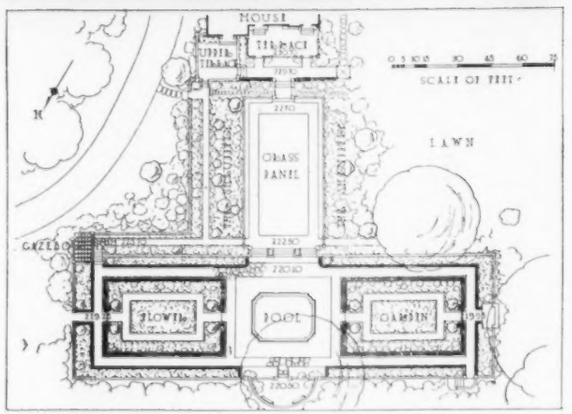
GENERAL VIEW

GARDEN AT IPSWICH, MASS.

OLMSTED BROTHERS, LANDSCAPE ARCHITECTS

The strength and dignity of the pine woods have dictated the simple lines and forms of the garden; restrained use of architectural accents and appropriate plant forms give effective interest





GARDEN OF H. G. LAPHAM, BROOKLINE, MASS.

OLMSTED BROTHERS, LANDSCAPE ARCHITECTS

A garden strongly influenced in its detail by an Elizabethan house, but clearly governed as to its general plan and conception by conditions,— sloping ground, limited area and fine existing trees

The Building Congress Idea

By WILLIAM STANLEY PARKER

THE Congress of the Building Industry has put into practice an idea hitherto apparently considered impossible of practical application—that employers, labor, material manufacturers and others of the industry can jointly discuss on equal terms matters of common concern.

That this has been demonstrated is due to a group of forward-looking architects who have largely initiated the work; progress is being made and results can now be measured; the movement deserves the active interest of architects, because it offers them for the first time an opportunity to exert impartial and professional influence in an effective manner.

THE EDITOR

ALL those associated with the building industry should take a keen interest in the recently announced formation of the American Construction Council. Its purpose as a conference organization is made clear in the preamble to its proposed by-laws which reads:

> With the desire to place the construction industry on a high plane of integrity and efficiency and to correlate the efforts towards betterment made by the existing organization, all the component parts of the industry herewith join in the formation of the American Construction Council, a conference association representative of the whole industry and dedicated to the improvement of the service which the construction industry renders to communities, states and nation.

The underlying idea of this council is that it is a body composed of representatives of all the elements of the industry—architects, engineers, general contractors, sub-contractors, labor, material manufacturers and dealers, financial, bond and insurance organizations, public utility construction departments and representatives of federal, state, county and municipal bureaus or departments concerned with construction. It is clearly not the intention of this new organization to assume controlling direction of any operations in the industry or to relieve any of the existing separate organizations of their natural functions and responsibilities. It is, as the preamble declares, a conference association whose efforts shall be to correlate the efforts of the existing organizations for the betterment of the industry as a whole.

It has been said in newspaper references to this organization that now for the first time this will be done. This is perhaps sufficiently accurate for a newspaper statement, but it is perhaps only fair to point out that it is not literally true. It has also been pointed out or intimated in recent editorial articles in the architectural press that there was a great opportunity for the architectural profession to do something towards correlating the work of the various elements of the industry, the inference being that the architects had not up to this time exerted any influence in such directions. This also does not accurately represent the facts.

It is only fair to say that the first constructive step in the development of the movement which appears to be consummated by the organization of the American Construction Council was taken by the American Institute of Architects in the spring of 1920, just two years ago, when its board of directors reported its belief in the necessity of such a movement and received the authority of the convention to proceed. As a result of this action, a meeting was held in Atlantic City in September, 1920, at which were present representatives of practically all the elements of the industry.

The need of closer co-operation between the different groups in the industry was argued, and the meeting was unanimous that some organization to this effect should be inaugurated. One of the fundamental ideas in the proposed scheme of organization was the primary importance of local groups, working out their own local problems. Any attempt to settle matters nationally by a national committee would be sure to fail of results. It is inconceivable, for instance, that a national committee could solve the problems of seasonal labor for both Boston and Los Angeles, Boston having a very serious problem of this kind, and Los Angeles as a matter of fact having practically no such problem. Similarly, with the fundamental relationships between employer and employe in the industry, there are fundamental local differences, and it would be idle to attempt to lay down any national rules to control such matters.

The movement which was started at that meeting was known as the National Congress of the Building and Construction Industry. The national committee was formed and preliminary meetings held, and preparations for a first national conference started. It was felt, however, that until definite progress had been made in the development of local groups, a national conference would be of no use. For this reason the national movement held itself in abeyance, excepting so far as it concerned itself with an effort to develop local groups.

Building Congress groups were started early in 1921 in New York and in Boston and have been in fairly active operation ever since. The New York group has developed a suggested code of ethics* for the building industry, which is one of the specific matters which the American Construction Council will consider. This code of ethics has been favorably received and acted on in various localities and represents a consensus of opinion in regard to the right relationships and practices that should exist. Like the Golden Rule and the Ten Commandments, if it were not only accepted but conscientiously lived up to, there would be little if any need for further efforts at improvement.

*Published, THE ARCHITECTURAL FORUM, January 1922, page 54, Service Section.

The Boston Congress turned its attention first to the question of seasonal employment in the industry, and after some weeks of discussion issued a brief report on the subject with a chart showing graphically and with approximate accuracy the trend of employment during a typical year in each of the principal trades. Of course issuance of a report does not correct the difficulty, and the problem is one of extreme difficulty. It may well be doubted whether more than a portion of the difficulty can be overcome. In any event, it will need the co-operation of the owners of property, who in the last analysis are the ones who determine when work shall be carried out. If they could be made to realize that they would get a better grade of mechanic and as a result better work in certain months of the year, even if the wage paid to the workman remained the same, they might rearrange a considerable amount of repair work and alterations so that the employment of the mechanics would come to a considerable extent in the low peak periods of employment. The owner, however, is a very difficult element in the industry to approach, as he is much less closely knit in his organizations, and is apt to work on an individualistic basis along lines of practical expediency that his own experience has developed.

The New York Congress also developed during the present year what appears to be a most admirable system of apprenticeship for the building trades. It is based upon the co-operation of the contractor and labor groups in the industry, and by their joint operation of a scheme for the industry as a whole, it seems to be assured of a degree of permanency that has not been a feature of the various independent schemes that have been tried.

Recently in Boston a meeting was held at which this apprenticeship problem was discussed, and the New York scheme explained by the educational adviser of the New York Apprenticeship Committee. Following the meeting the Boston Congress passed a resolution in favor of an apprenticeship system in these terms:

Whereas, an adequate supply of properly skilled mechanics is essential to the proper functioning of the building industry, and

Whereas, in the opinion of the Boston Building Congress such a supply cannot be obtained without an adequate system for the training and employment of apprentices, be it

Resolved, that it is essential to the interests of the building industry in the Boston district that a general system for the training and employment of apprentices be established, and be it further

Resolved, that organized representatives of labor and of contractors in all trades connected with the building industry and other interested groups be sent a copy of this resolution, together with a copy of the New York system by way of suggestion, and that they be urged to co-operate in the establishment of a system for the Boston district.

The point in these various actions that is most significant is that they have all been the result of the co-operation of representatives of all the elements in the industry, from the owner through the intermediate designing and administrative elements to the actual mechanic who places the material on the job. The report on seasonal labor is not an outside analysis of the labor situation by some investigator, but is the result of frequent discussions with a group of labor men, analyzing statistics which they themselves have collected and presented for discussion. The apprenticeship system is not some scheme being proposed by the contractors in an effort to get cheaper labor, or by labor with some hidden possible motive of limiting the number of apprentices that might be employed. It is a scheme to meet the practical needs of the growing industry, presented by contractors and labor men in conjunction with the other elements of the industry,—all being conscious of the fact that without an adequate, properly trained force of mechanics the other elements of the industry cannot function.

These joint discussions have been a new experience for those who have taken part in them, and they have been shown the great possibilities for good that lie in such joint action. Nothing so tends to break down barriers of misunderstanding and suspicion as meeting face to face in a discussion of common problems. The misunderstanding and suspicion that exist in the building industry are its most serious problems, and they can best be solved by just this sort of democratic co-operation, in which no element is superior in importance to any other element, but each is essential to the success of every other.

Recently, active groups of the Congress have been started in the states of Washington and Oregon, and steps toward organization have also been taken in Philadelphia. There have been many isolated examples of co-operation between a few of the elements in the industry for some particular work, such as the classes for the training of mechanics that have been developed in the last year or two in Philadelphia. They will gain in permanence and value when they have become merely one manifestation of general co-operation such as the Building Congress idea involves.

In the opinion of those who are guiding the initial steps of the American Construction Council, one of its first and most important activities should be the stimulation of the organization of similar groups in all the major centers throughout the country. Through the National Council the results of all these various local groups can be made available to all, and the work of each greatly advanced in this way. The industry has long been over-organized in its individual elements, each seeking to foster its own interests, not consciously in opposition to the interests of the other elements, but merely regardless of their interests; but the industry as a whole has been absolutely unorganized—one might almost as well or better say disorganized.

Now at last, and for the first time, it seems that the industry may become conscious of itself as a whole, with the possibility—indeed let us hope the probability—that in so doing each functional element of the industry will be able to recognize more accurately its own relative position in the industry, and act with a broader conception of the interests of the industry as a whole.

ENGINEERING DEPARTMENT

Charles A. Whittemore, *Associate Editor*

Electrical Wiring Layouts for Modern Buildings

PART VI

By NELSON C. ROSS, *Associate Member, A.I.E.E.*

IN drawing the plans for the wiring of a building of any kind there must be careful consideration of all the various forms of service which are to be installed. Each of these forms has different requirements which the architect should take into account.

WATCHMEN'S CLOCK CIRCUITS. These clock stations are desirable on large residence work where a number of outbuildings are to be patrolled. The magneto system is generally used, with a clock in the office or at some central point and with the number of stations required. No battery is used, as each station is a magneto generator, the watchman inserting a crank in the magneto, the turning of which draws down the hammer at the clock, thus registering the number on the dial chart. One wire, common to all stations, and one individual wire are required for the system. These should be run in conduits, ¾-inch conduit as a rule being ample for general work of this kind. No. 16 rubber-covered wire is required.

PROVISION FOR WIRELESS STATION. In providing for the use of radio equipment it is important that the matter of "grounding" be carefully considered, as insurance requirements are strict and must be followed (Fig. 1). The room where the equipment is to be used should preferably be on an upper floor, and standard insulators should be carried through the building wall for the lead in wires, these insulators extending 5 inches on each side of the wall, porcelain tubes not being permitted. If there is a possibility of a sending station, a standard 100-ampere, 600-volt, single pole, double throw ground switch must be used. If a receiving station only is to be considered, the ground switch may be replaced by a short gap, or vacuum type lightning arrestor. The switch or arrestor must be mounted, so that the current-carrying parts are 5 inches from the surface of the building wall, and the ground wire should be not less than No. 4 B. & S. gauge. The switch must always be thrown to ground when the equipment is not in use. The switch is installed on the outside of the house and may be operated by opening a window or by means of an extension rod or toggle extending into the building.

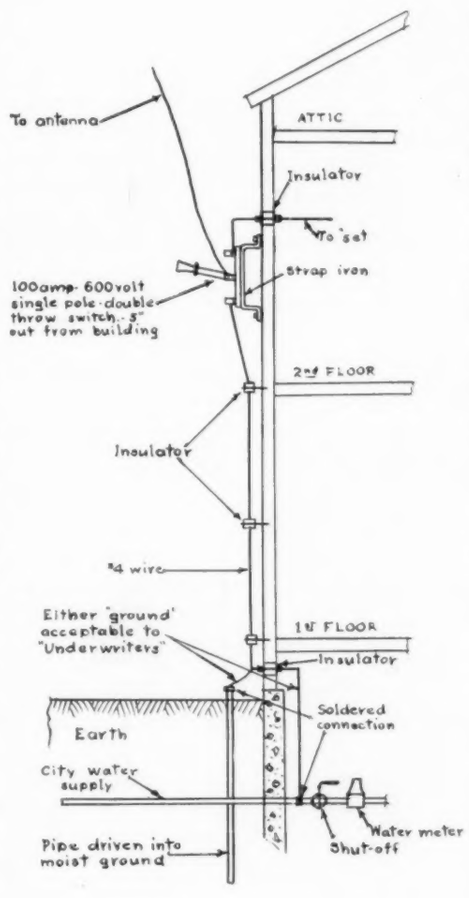


Fig. 1

The insurance requirements are that the ground wire be exposed on the outside of the building, and this wire must not be run in a pipe unless the pipe is bonded to the wire at both ends. The wire may be grounded to a water main or an artificial ground as in Fig. 1.

OLD BUILDINGS. In the wiring layouts covering old buildings, the locations of outlets and general arrangement of circuits would be the same as for new buildings. In the construction, however, we are as a rule compelled to use B. X. armored wire, and the work should be laid out so that there will be as little cutting of the floors and timbers as is possible. If during repairs floors and ceilings are to be torn up, conduits may be used, or B. X. wire clipped into place without reference to the floors and ceilings. Where general repairs are not to be made the floors and baseboards must be pocketed and the wire fished from outlet to outlet (Fig. 2).

Where there is an unfinished attic, the floor boards may be removed and the outlets installed in the ceiling of the floor below, and the circuits dropped in the walls to switches and brackets. Feeder circuits as a rule may be carried up in the space around the chimney to the attic and there distributed to the outlets, the panel box and fuses being in the basement. For bracket outlets and switches on the floor above the basement the wires may pass up into

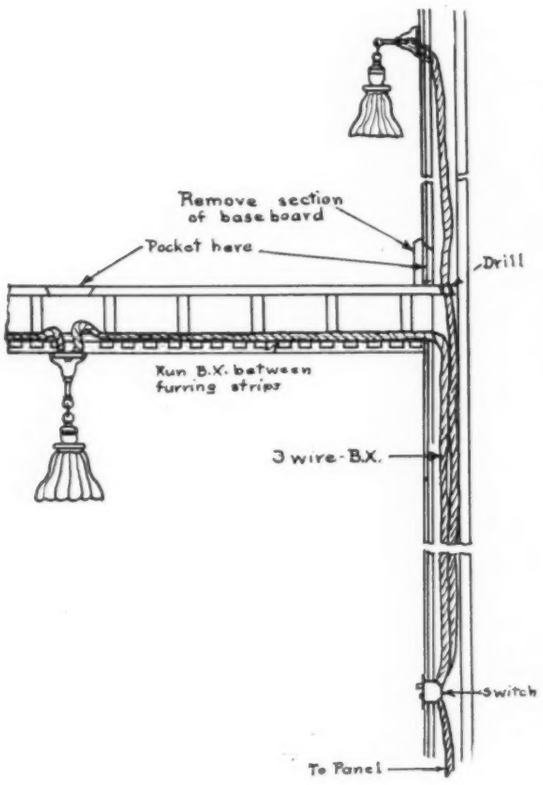


Fig. 2

the walls from the basement. For ceiling outlets on this floor, however, the wires must pass up to the floor above, the baseboard being pocketed on this floor, as well as a pocket being cut in the floor at a point above the outlet, the wire then being fished through the two pockets to the proper outlets. B. X. armored wire is easily fished between timbers, and where care is used may be fished across timbers between furring strips, and between the lath and the bottom of the timbers.

In many cases it is not advisable to pocket floors or to cut baseboards. In such cases the ceiling must be pocketed, sometimes in two or more places, a hole made in the lath, and the hole patched after the wires are in place. Where walls are firestopped with brick, or in the case with many old houses where walls are heavily bridged, it may be necessary to cut through the plaster and to channel the firestopping, etc. to permit the wires to be drawn into place. On outer walls of brick, B. X. wire may be fished between the furring strips. Where, however, the plastering is on the brick without furring, the walls must be channeled to permit the wires to be concealed, or the wires must be run in exposed wiremould or metal mouldings.

Where panel boxes are to be placed on different floors, flexible tubing may be used for mains and risers. Rigid conduits are in nearly all cases used in the basement. Where possible, panel boxes may be located in closets on the different floors and the risers run in rigid conduits exposed, the conduits being painted after installation.

Lighting of Grounds. The lighting of grounds or walks may be cared for on a general circuit controlled from one point, or where there are several buildings, circuits may be run out from each building and controlled by means of local switches (Fig. 3). While overhead lines and iron or finished wooden poles may be used for ground lighting, it is not advisable as the wires being small are likely to give trouble during winter ice storms. Possibly the most satisfactory method of lighting grounds is by means of iron poles and armored cable, the cable laid in a slot or trench 15 inches below the surface and without further protection.

In the cable referred to the wires are insulated with rubber, made up in cable form and sheathed with lead, the lead covered with a serving of tarred jute, two tapings of steel ribbon, and a final serving of jute saturated in tar compound. The cable is finally given a bath of French chalk to absorb excess tar. This cable, which is very flexible, is waterproof and proof against reasonable mechanical injury, is made in all sizes, and can be had in any length. It is less expensive than underground conduit and wire, and is not laid to grade or with pits and splicing boxes. This cable may be run through a hole in the basement wall, and looped from pole to pole, the splices being made at the socket. A single switch may be used, located at a convenient point in the corridor, or where there are a large number of lights to be controlled a solenoid switch may be mounted in the basement and the monitor or push-button switch located in the corridor. All fuses, etc. should be located in the basement, preferably at the point where the armored cables leave the basement.

Proportioning Feeder Cables. It is obvious that the capacity of a feeder cable must be ample to care for the combined loads of all wires served by the feeder, and that the capacity of the service main must be ample to care for the combined loads on all feeders. This does not mean that the cross section of the main must be equal to the combined cross section of all wires in the building, but that the capacity of the feeder or main must be ample to care for the greatest load or demand of the building at any time. In residence work the lengths of mains and feeder cables are such that if the copper is proportioned for the ampere load it will be amply large for all purposes. Each size of wire is allowed a certain current-carrying capacity, by the National Code, as given in the table. The allowable current

is the maximum amount that, if continued indefinitely, will not raise the temperature of the wire to a point harmful to the insulation.

In proportioning copper, if there are ten circuits feeding from a panel, each circuit supplying six 100-watt lamps, and all of these lamps may be in use at the same time, the greatest, or peak load, will be ten circuits times six lamps, or sixty 100-watt lamps or 6000 watts; if the feeder circuit is two-wire, 110-volts, the current demanded at the panel will be 6000 divided by 110 volts, or 54.5 amperes. By consulting the table it will be seen that a No. 6 wire is allowed 50 amperes, a No. 5 wire 55 amperes, and a No. 4 wire 70 amperes. As No. 5 wire is not standard, *two No. 4 wires* should be used. Under like conditions, if the voltage were 110–220 volts on the three-wire system, we would divide 6000 watts by 220 volts, which would give a current demand of 27.2 amperes. It will be seen that No. 10 wire is allowed 25 amperes and No. 8 wire 35 amperes, so *three No. 8 wires* are better.

Likewise, if there were three panels in the building, each with 6000 watts connected load, and say an electric range which will demand 10,000 watts at full capacity, the total connected load in the building will be 18,000 watts for the panels and 10,000 watts for the range, or a total of 28,000 watts. Now, 28,000 watts at 110 volts require 254.5 amperes, and at 220 volts require 127.3 amperes. It is not probable, however, that every lamp and the full capacity of the range will be used at the same time, so that if the mains are proportioned for 80 per cent of the connected load, we would require copper for 203.6 amperes on 110-volt, two-wire service and for 101.8 amperes on 110-220-volt, three-wire service, or two No. 0000 wires, or three No. 0 wires respectively, the mains and feeders of course to be fused for their allowable carrying capacity. In determining a percentage of the connected load for which to allow copper, the conditions of operation should be carefully considered and copper should be provided to care for the greatest average load that may be demanded; if there is a question of doubt, it is better to make the wire large than to take chances with too small feeders.

Knife switches and fuses have been standardized in these sizes: 30-ampere, 60-ampere, 100-ampere, 200-ampere, 400-ampere and 600-ampere, and fuse clips are proportioned for these switches: 1-30-ampere, 31-60-ampere, 61-100-ampere, 101-200-ampere, 201-400-ampere and 401-600-ampere.

The fuse cases are of different sizes, and each will fit the clips corresponding to the capacity. Thus, if the load is 65 amperes, we must use a 100-ampere switch, as no 65-ampere switch is made. This switch takes a 100-ampere fuse case, but the fuse wire in the case may be of any value between 61 and 100 amperes. Likewise, if the load is 225 amperes we must use a 400-ampere switch, but may use 225-ampere fuse wire in a 400-ampere fuse case. Thus, if we are to use a No. 4 wire, which is good for a load of 70 amperes, we must use a 100-ampere switch but must use 70-ampere fuses to protect this wire. It is immaterial whether we are using 110-220 volts,—we must in all cases fuse to protect the current-carrying capacity of the wire.

While bare copper wire and wires covered with weatherproof insulation are commonly used for outside circuits and line service, and while wires insulated with varnished cambric are used for circuits that are subjected to high temperatures, the standard rubber-covered wires should be used for all interior work, whether these wires are installed in conduits, mouldings or on cleat construction. The table included here gives the current allowed for the different wires likely to be used.

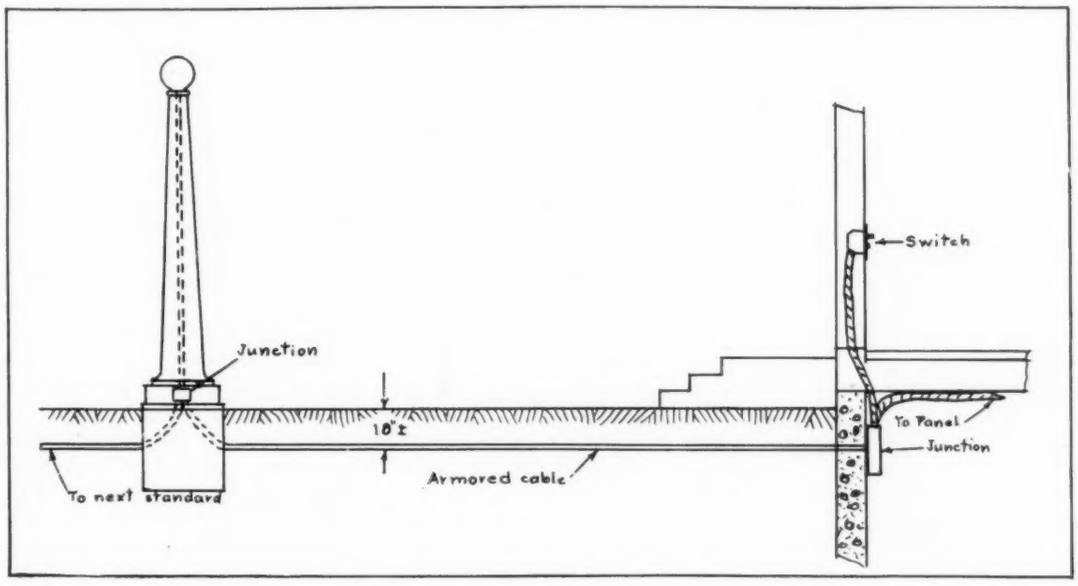


Fig. 3

ALLOWABLE CARRYING CAPACITIES OF WIRES

B. & S. gauge	Diameter of solid wires in mils	Area in circular mils	Rubber insulation amperes
18	40.3	1,624	3
16	50.8	2,583	6
14	64.1	4,107	15
12	80.8	6,530	20
10	101.9	10,380	25
8	128.5	16,510	35
6	162.0	26,250	50
5	181.9	33,100	55
4	204.3	41,740	70
3	229.4	52,630	80
2	257.6	66,370	90
1	289.3	83,690	100
0	325.0	105,500	125
00	364.8	133,100	150
000	409.6	167,800	175
		200,000	200
0000	460.0	211,600	225
		250,000	250
		300,000	275
		350,000	300
		400,000	325
		500,000	400

ISOLATED RESIDENCE PLANTS. In many locations electric service is not available, or the service lines may be so far away that the cost of the pole line to the building may prove prohibitive. For such conditions the so-called "farm lighting plant" may be used. This equipment, which is furnished by several manufacturers, is nearly automatic in its action, and is not expensive to install or to operate. The plant consists of a small four-cycle, internal combustion engine direct, connected to a direct current generator, a storage battery and a switchboard. The engine uses kerosene and may be located in the basement.

The plants are made in these capacities:

300-watt size, operating at 16 volts, with 80-ampere-hour storage battery. This size is used for lighting only.

600-watt size, operating at 32 volts, with 80- or 160-ampere-hour battery. This set may be used for lighting and for running a motor up to ½ h. p. when the engine is running.

850-watt size, operating at 32 volts, with 160-ampere-hour battery. This set may be used for lighting, operating table cooking equipment and fo r running ¾ h. p. motor when the engine is running.

1250-watt size, operating at 110 volts, with 160-ampere-hour battery. This set is of capacity to operate two or three flatirons, or table cooking equipment and a motor of 1 h. p. capacity, when engine is running.

2500-watt size, operating at 110 volts, with 160-ampere-hour battery. This set will render all the service just mentioned and will operate motor of 2 h. p. capacity with engine running.

The smaller sized plant is available for use in a camp or small house for lighting only.

The 600-watt and 850-watt plants operate at 32 volts, and are of sufficient capacity to care for a large house or farm, and will run small motors, flat irons and the usual table equipment such as toasters, grills or chafing dishes. This voltage is standardized for these plants and the usual equipment is manufactured to operate on this voltage. In ordering such equipment, however, it is necessary to mention the voltage at which the equipment is to be used.

The 1250-watt and 2500-watt plants will care for nearly any large residence or farm. The plants operate at standard voltage, and any standard equipment may be used on the circuits.

In many cases such a plant is installed as an auxiliary to the regular electric service (where such service is intermittent, due to line trouble, or storms), as with its use, in the event of interrupted service, the plant may be started and render service until the lines are repaired. Where greater capacity is required than is available with one plant, duplicate equipment may be installed and connected to work together.

The wiring layout for the building would be the same, whether the service wire is taken from the service lines or from the small isolated plant. When the plant is used as auxiliary to the outside service, a double throw switch is installed so that the service may be taken from the lines or from the plant at will.

With the use of these plants a large fuel storage is not required, as the engine tank holds sufficient fuel to operate under average conditions from three days to one week, and the tank is refilled as needed. The engine is started by means of a switch or by means of a push-button, so that neither strength nor skill is required to put the plant in operation. When the battery is fully charged the engine automatically stops.

On larger residence work it is customary to locate the plant in a stable or outhouse, the feeder cables running from the plant switchboard to the house and to the different outbuildings, also for the lighting of the grounds. Where possible, the feeder cables should be run underground, either through conduits or by using lead-sheathed, armored cables. Where, however, to save expense, the feeder wires are installed on poles, the wires used should be large enough to bear the usual weight of ice and snow during the winter months; usually nothing smaller than No. 8 wires should be used for overhead lines. All overhead lines should be protected by lightning arrestors, one arrestor being used and connected to each wire, and all arrestors connected to a common ground wire, this to be securely bonded to a water pipe; the ground wire should not be less than No. 6; one set of arrestors is sufficient to protect approximately 2,000 feet of line.

Elevator Installation

PART II

By HUBERT M. GARRIOTT, ARCHITECT

IN connection with elevator installations there is such a multiplicity of problems which confront the architect at the start of the work that it is quite important to keep abreast of the times as to material and methods. In a previous discussion the layout of the hoistway and shaft was considered and some consideration was given to types of elevators. In this discussion we wish to call attention to the types of doors and various accessories to the elevator equipment.

There is no doubt but that one of the most perplexing problems in connection with the elevator layout is the selection and arrangement of the doors. The difference between the size of the opening into the elevator which the plans call for and the actual sizes and development in the finished project is frequently a source of embarrassment to the architect. This is due to one of two things: first, the architects may not have been sufficiently careful in laying out the door openings; second, the car opening may not agree with the construction of the elevator fronts and the underwriters' requirements. A casual observation of elevator fronts and doors in commercial office buildings will show many instances in which the door when opened leaves a wide space between the edge of the jamb and the edge of the car platform (Fig. 1). It is safe to say that every such building carries a penalty charge on the insurance premiums because of such poor construction. In these instances a solid filler should be extended from the car posts to prevent accidents. Some such protective method is required by the insurance companies in order to eliminate the "defect" charge. It is in the interest of every architect and building owner to prevent the existence of this poor form of layout. All that is necessary is to see that the parts "hitch" together and that there are no interstices between.

The openings into the hoistway should be determined at the same time that the general layout of the elevator shaft is decided upon, as the side clearance between the platform and hoistway walls absolutely determines the distance the side jamb of the doors should project beyond these walls, so that when the doors are opened the jamb of the opening and the clearance in the car will be opposite each other (Fig. 2). One can readily see how the corner post type of car will cause a smaller jamb to be constructed than the side post type, due to the difference in clearance. If the plans are first prepared with a side post type of car and then corner post construction is adopted, the fronts will not properly register unless the elevator fronts are changed as well.

The problem of doors is one of a good deal of interest and much importance. Shall the door be a single sliding panel (Figs. 1 and 2) or shall it be a "two-speed, three-part" door (Fig. 3), that is, with one standing panel and two sliding panels, or shall it be "two-speed, two-part" with no standing panel? The type of elevator layout will control to a certain extent the latter method of construction. A two-speed, two-part type (Fig. 4) takes very much more space in the hoistway in order to develop the maximum amount of opening into the car than any other type. With the two-speed, standing panel type, it is obvious that two-thirds of the distance between the jambs may be clear opening and the sliding panels may slide behind the standing panel so that the minimum of hoistway construction is needed to accommodate these doors. On the other hand, the most inexpensive and most

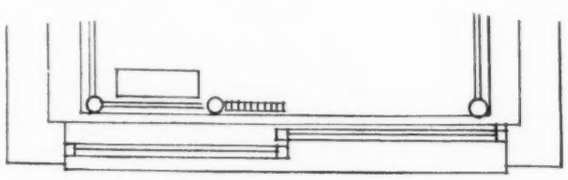


Fig. 1

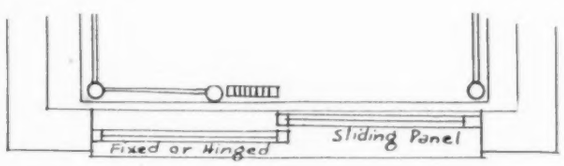


Fig. 2

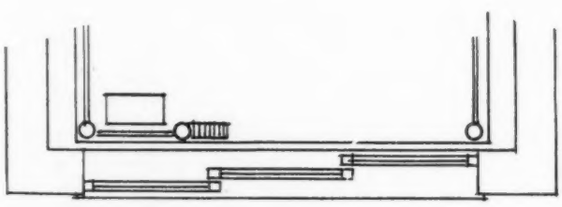


Fig. 3

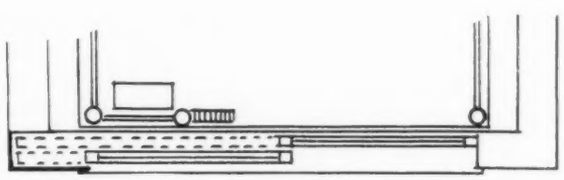


Fig. 4

frequently adopted type is the single slide panel which gives half of the opening. These are easy to construct and meet all the requirements of the normal type car of small capacity. In the modern office buildings, however, where the elevator traffic is large, particularly during rush hours, a two-speed door giving so much more opening into the car will afford greater facilities for handling the crowd.

Where the door adopted is a single sliding panel it is always wise to hinge the standing panel so that the car may develop the maximum opening in case it is used in emergencies for carrying freight or office furniture. With the two-speed doors this same provision is frequently of value.

The designs of door and enclosure necessitate some study. Modern building law requirements are reasonably uniform in calling for a tight enclosure rather than an open grille, such as was so customary when elevators were first used. The theory of fire prevention demands as few open connections between floors of a building as are practicable. As a result the majority of building codes insist that "all vertical openings," meaning stairs as well as elevators, "must be protected by a fireproof enclosure." The most common method of construction adopted to meet these conditions is the use of metal grilles backed up by glass in which wire is embedded. Clear or polished wire glass is always preferable for the doors as it enables the operator to see passengers at the various levels. This is more expensive than the pattern or rough wire glass, but the added cost is more than repaid in the better appearance. Elevator shafts probably never can be made smoke-tight, but a shaft with glazed metal doors will act as a retardant to the spread of fire and will prevent the "mushrooming" of fire from floor to floor.

There are on the market many safety devices which when attached to door or car minimize the possibility of accidents through doors being left open after the car has passed its landing or through carelessness in operation of the car before the door is closed. Probably 90 per cent of the injuries and fatalities in elevators are due to this. As a result, continual research is being conducted to find the ideal solution. A device to be perfect must prevent the opening of any shaftway door when the car is not level or within a few inches of level with the floor at any landing. It must also preclude the possibility of the car's being moved before the door is tightly closed. It must, however, be so arranged that in case of accident the door may be opened from the well side so that passengers may escape.

No elevator should be installed, even in unimportant buildings, without some protective device. There are now door locks which control the current, others which hold the door in place until released by a "trigger" on the car platform, others which by means of an air check open or close the door when the car stops at a landing. All these devices are good for certain installations and each has its appeal and strong adherents. Some of the elevator manufacturers have developed a patented mechanism by means of which a car is automatically leveled with the floor at any landing. The value of this device is at once apparent to those who have observed the carelessness with which some operators stop the car and to those who so frequently hear the "step down" or "step up, please" of the operator. One can readily see that the automatic leveling car cannot be instantaneous and consequently must "slow up" the "car miles per day." In a high building a local elevator would be appreciably longer on each trip than if the operator leveled the car by the switch. No doubt the defects will be overcome, and soon the high speed cars will be controlled at the stops with an accuracy of level not now thought possible.

Signal devices are important. In a multiple installation one can readily see the nearest approaching car. There are those general types, "up" and "down" lights, mechanical pointers and liquid columns. Of these the signal lights are probably the more common, although many of the other types are used. With the electric lights there is probably less mechanical difficulty than with the others, but a special distribution board which is quite complex is required. One part of the signal system which is frequently overlooked is the night bell. There should be in each car a bell which will ring when any button is pressed. This bell system should be controlled by a switch placed in the well near the first floor so that after the general business hours an audible signal may call the operator to the car. Many buildings also have a "call back" system. This consists of a series of buttons, one for each car, so that the starter may call any car from any position back to the street floor.

It is a matter of some debate as to whether the operating switch should be located at the right hand or at the left hand of the operator. There is no set rule, and the location may be changed for special conditions. In a multiple installation, however, each car should have the switch in the same relative position so that the operators may not be confused in changing from one car to another. Some argue that the right hand is more subconsciously controlled and therefore the switch should be at the right; others think that the right hand is more adapted to the opening and closing of the doors, leaving the lesser work for the weaker member. This, however, like many other plans of elevator installation must be determined by the architect or engineer after considering all the phases of the system and the particular needs of the problem at hand.

The ideal elevator installation combines the maximum of safety with the maximum speed in handling passengers, together with quiet operation and the minimum opportunity for carelessness, and at the same time the element of economical operation both as to current consumption and maintenance repairs.

An Informal Garden at Shadowbrook Farm

ESTATE OF MORTON C. NICHOLS, ESQ., GREENWICH, CONN.

PERENNIAL PLANTS APPEAR TO FINE ADVANTAGE AGAINST SHRUBBERY BACKGROUND

ENGLISH LEAD FIGURES FRAME AN OPENING IN SPIREA HEDGE TO LAWN

EDITORIAL COMMENT

FORECASTING CONSTRUCTION COSTS

TIME was when the functions of design and construction were closely linked. The architect worked out his designs with the artisans and craftsmen in the field, and there was a direct bond of sympathy between the man directing the work and those actually engaged in construction. Over the years the work of building has grown increasingly complex; our great modern buildings are made possible through steel construction, elaborate foundations and a veritable maze of mechanical equipment that provides heat, sanitation, light and transportation. This development has resulted in specialization and we have today, therefore, the engineer who is chiefly concerned with construction and installation of equipment and the architect whose work is being increasingly restricted to architectural design. The management of the construction and, to a large extent, the determination of the methods of construction and the supervision of work have passed to the contractor.

An important change has taken place also in the contracting field. At the beginning of the contracting system a general contractor was an expert builder, often qualified with thorough technical knowledge of the major building trades; but this field, too, has been narrowed down by specialization so that we have the general contractor, proficient in but one trade or, as is perhaps more often the case today, with no technical knowledge of any trade but acting solely as a broker.

This system has been responsible for some good in that it has developed individual sub-contractors and groups of workmen who are especially skilled, but offsetting this to a very large degree are many evils. The system primarily creates competition in prices, because the lower the sub-contract price the general contractor can secure, the greater his profit, and the pressure for low bids has resulted in the formation of countless sub-contractors' associations, primarily for protection against the trading of the contractor, but which once organized rapidly degenerate into price-fixing agencies.

This system is a barrier to the architect in his desire to obtain the best type of construction. As a remedy some architects have practiced the direct letting of contracts to the major sub-contractors, but on the whole this has not proved a satisfactory arrangement because there is lack of co-ordination between those trades directed by the architect and those directed by the general contractor, and the logical development of a scheme such as this would be the handling of all the contracts by the architect; but if this is followed, he becomes in fact a general contractor, which duty architects as a whole are not yet ready to accept for professional reasons.

The greatest single difficulty architects experience is their inability to forecast accurately construction costs, and this is natural because by the very nature of modern building conditions they have little opportunity of getting fundamental information regarding building costs. A definite need exists for some method which will enable the architect to be the judge of costs and thus meet the requirements that the public imposes on him because of the traditional position he is held to occupy. Knowledge of costs is likewise necessary from the economic standpoint of the architect himself, because as practice is carried on today thousands of dollars are wasted in the preparation of drawings which are later discarded when bids are taken. Any scheme to eliminate this difficulty must, therefore, be elastic—one that will permit the checking of costs and the design of a building to go along hand in hand. The first remedy might appear to be the addition of an estimating department to the architect's organization, but this again entails a commercial consideration in that the architect will be placed more or less in the position of guaranteeing costs, and this is as yet not conceded to be within the professional limits of the practice of architecture.

A more practical scheme, and one that does not conflict with professional considerations, is a closer working arrangement between the architect and a selected number of the better type of general contractors. This means that the architect must place absolute confidence in the integrity and skill of the contractor, but it should not be difficult to find men of this caliber who will respect the opportunity for co-operation which the architect's attitude makes possible. A close working arrangement such as this will enable the architect to check his costs as his design proceeds; his materials of construction and methods of building will be determined with the limits of cost always in mind; he will be in a position to have a voice in the selection of sub-contractors, and his assurance of getting good workmanship will accordingly be greater. His estimates will present to the client not his own guaranteed costs but those of reputable builders. The greater degree of harmony in construction resulting from such co-operation will also insure more prompt completion of the building—an important consideration to the owner.

The architect, on his side, gives up nothing but the doubtful advantages of competitive bidding, and any merit this system may once have had is overbalanced by the greater good resulting from according the fair dealing, intelligent contractor a professional status which will eventually tend to raise the standards of the entire building industry.

DECORATION *and* FURNITURE

A DEPARTMENT
DEVOTED TO THE VARIED
PROFESSIONAL & DESIGN INTERESTS
WITH SPECIAL REFERENCE TO
AVAILABLE MATERIALS

DRAWING ROOM DESIGNED BY PAUL CHALFIN

ADAPTATION OF THE ITALIAN-LOUIS XV PERIOD

Contrast of color values, harmony of scale and perfect relation between the furniture and the background are rarely realized as in this room. The remarkable contrast of the most elaborate ornamentation to the simple composition of the wall surfaces and the relation of the furniture grouping to the architecture mark this as one of the most brilliant rooms executed in America

Adapting the Eighteenth Century Interior

By HOWARD MAJOR, ARCHITECT

THE architect entrusted with the interior decorations of a house has an opportunity for complete expression; he is enabled to supplement, to contrast, to harmonize his interior architecture with his interior decoration.

It is thoroughly appreciated that however skillfully the facades of the house are designed, the effect lacks charm and atmosphere without the aid of proper planting. Likewise, the carefully handled interior requires the proper furnishing, but this fact most architects apparently overlook. Clients invariably consult the architect upon the landscaping, but unfortunately rarely upon the decoration. Probably the professional instinct of the architect causes him to hesitate soliciting from the client a commission in this field, but having the true interests of the work at heart and a full realization of the results in mind, a decided effort should be made to either execute or supervise the furnishings. The architects of the eighteenth century well understood this important phase of not only arranging, but actually designing the various pieces necessary for a completely furnished home. The well known example of the brothers Adam may be cited, as their designs in furniture and even in silverware are famous.

PLANNING THE INTERIOR. Having emphasized the importance of the architect's executing or supervising the decorations, some suggestions are offered to help to attain a satisfactory result. The earliest sketches of the house must include thought of the decorative scheme. This will counteract the common fault of too much fondness for the facade to the detriment of the interior. Care should be taken to avoid the mistake of planning a facade of one style with an unrelated interior of another. The windows are the common property of both and will be a jarring feature to one or the other. With the early sketches must be determined the general period or related periods of the whole. This determined, the proportions of the various rooms can be intelligently studied, bearing in mind the peculiarities of proportions of the selected period, the location of the chimneypiece, its proportions and scale, and above all the furniture grouping. A vista of the chimneypiece from the hall is a desirable feature, while closely flanking the breast with windows or doors is unwise; daylight directly in the eyes of the group around the fire is uncomfortable, as is also circulation past the group through the doors. Where doors are unavoidable those paneled in wood are preferable to those of glass. A deep projection of the chimney breast is extremely awkward; a breast projecting from two to six inches is of sufficient emphasis, and often the entire elimination of the breast is desirable.

Probably one of the greatest faults in our domestic architecture is the arrangement, the proportions and the scale of the windows, from the viewpoint of the room, and I dare say it is this feature alone that convinces the decorator that our profession has much to learn. Design the window from the inside of the house and adapt the facade to it. In eighteenth century usage, of which this article treats, the window is invariably given a dignity attained by height and vertical proportions. The height of the window dominates the height of the door; this is invariably true excepting possibly in some few farm dwellings. Often it is advisable to place two windows instead of one on the side of the room, that a decorative piece of furniture may claim the axis. The entrance door with well defined vertical proportions should be placed in a commanding position, bearing well in mind the furniture arrangement, and avoiding a wider opening than necessary if scale is to be preserved.

For the sake of balance or design, blind doors may well be used where they are of secondary importance. Never use glass doors in the interior. They are a contradiction of their intended use. The designer must ever bear in mind that an atmosphere of charm and character is essential to a successful room. This is often attained by introducing quaint period discrepancies of proportions or features. Studiously avoid the commonplace, and be ever on the watch for quaint motifs—motifs that have variations from the rules of Vignola and the common practice and that are unusual and effective. Always have in mind scale, and realize the constant tendency towards heaviness and towards detail suitable only for the exterior.

Never, in planning, use a room as means of access to another room. It is impossible to create a feeling of comfort in a room used as a passage.

ARCHITECTURAL BACKGROUND OF THE EIGHTEENTH CENTURY. Throughout the last three quarters of the eighteenth century on the continent, in the British Empire and America, there was a strong similarity of decorative principles, although each country had its individualities. In this century are well defined the dignified, the vertical and the classical motifs. When paneling is used the vertical lines decidedly predominate, and occasionally the corners of the room are eliminated by an arc of paneling connecting the sides and successfully softening the sharp effect of the rectangular room. Further interesting shapes were developed, the most successful of which are those of an elliptical or circular plan, and rooms with segmental ends. Wall surfaces are generally painted, and paneled rooms of hardwood and walls covered with fabrics are also introduced. In this period it is noted that the tapestry, so much in favor in the earlier work, is fast disappearing, being

Living Room Designed by Paul Chalfin

In this eighteenth century Venetian room the grouping of the chairs either side of the commode is unusual and well related to the architecture of this interesting wall with its marbleizing and other quaint features

supplanted by mirrors, portraits and highly decorative paintings. The flooring, particularly in France, offers interesting study. Strange to say, very large scale oak strips are used, filled with herringbone or other patterns, and the small alternating black and white squares of marble are much in vogue in the halls and corridors. The chandelier, used with candles and reflected in the mirror, is a feature of decoration, and much thought and skill were expended upon its design. The happy use of crystal combined with delicate metal work gave a lightness and playfulness as a decorative feature hard to surpass. This chandelier created the excuse for the interesting centerpieces of the period upon the otherwise generally plain plastered ceilings.

FURNITURE ARRANGEMENT. In well planned living quarters the problem of arrangement reduces itself to the living room or library or both; since the dining room and the sleeping room arrangement is quite obvious, the treatment of the former only shall be considered.

Probably a one-quarter-inch scale plan of the room is for the architect the most convenient and practical for studying the grouping of furniture. Each piece of furniture, the lamps and the fabrics can be indicated and notations made indicating the character, design and color thereof. This small pencil study can be varied as progress is made upon the selection of the various objects, and it can readily be carried in the pocket to consult when shopping. It will form a nucleus when the various pieces are assembled in the room for a first arrangement, and it is surprising how seldom it greatly varies. Consider carefully the personal element, that is, the probable use of the room and the type of people that will dwell in it. When grouping, as in architecture, avoid hackneyed arrangements. Aim to create comfort, charm and individuality, and try to secure a result that is personal. The major sitting group, naturally near the fireside, comple-

Sitting Room in House of J. A. Burden, Esq.

Delano & Aldrich, Architects

With the introduction of an American empire mantel of black marble, contrasting bare but well proportioned walls, an air of elegant simplicity is produced. The Louis XVI chair and the small projection to the chimney breast also help to attain this effect

ments that architectural feature, the chimneypiece. This group, primarily one for conversational purposes, is composed of absolutely comfortable chairs or settees flanked by small tables for reading lamps, ash trays, books, matches and other details making for comfort and convenience. This conversational group can readily be increased by the addition of small side chairs, which have their decorative place elsewhere in the room. The arrangement of objects to be placed against the walls, such as commodes, console tables, settees, etc., is the next detail to be determined. Often these pieces will suggest secondary sitting groups, composed of fewer and possibly smaller chairs than the major group. Next to comfortable lounging pieces, nothing gives more actual comfort, as well as the appearance of comfort, than many small, low tables conveniently placed.

Living Room Designed by Paul Chalfin

In this adaptation of the Italian empire is a well balanced furniture arrangement, directly related to the architecture. Many small tables conveniently placed and the screen tend to create an intimate effect

SELECTION OF FURNITURE. Upon the consideration of the furniture the question of the antique *versus* the reproduction immediately arises. The charm, the individuality, the sense of possession of the old can never be attained by the new. The ever increasing intrinsic value of the antique against the decreasing value of the modern seems to answer finally the question. The introduction of a few antiques in the home has often resulted in the making of a collector. Year after year more are going in for this sort of thing, and it is greatly increasing an artistic appreciation and knowledge of taste in our country.

The period of the architectural background should dominate the period of the furniture. It is often advisable to introduce pieces of other periods that harmonize and are related to soften the set effect of a single period. Rooms executed in the periods of the sixteenth and seventeenth centuries will frequently be greatly improved by the introduction of pieces of considerably later periods. For instance, a chair of the time of Louis XV with its voluptuous curved lines will create a happy freedom of movement and contrast with the heavy, rectangular lines of the earlier period. A chair of the original period with its straight lines placed in the same position would most likely prove awkward and uncomfortable. Needless to say, this

The Living Room of J. A. Burden, Esq.

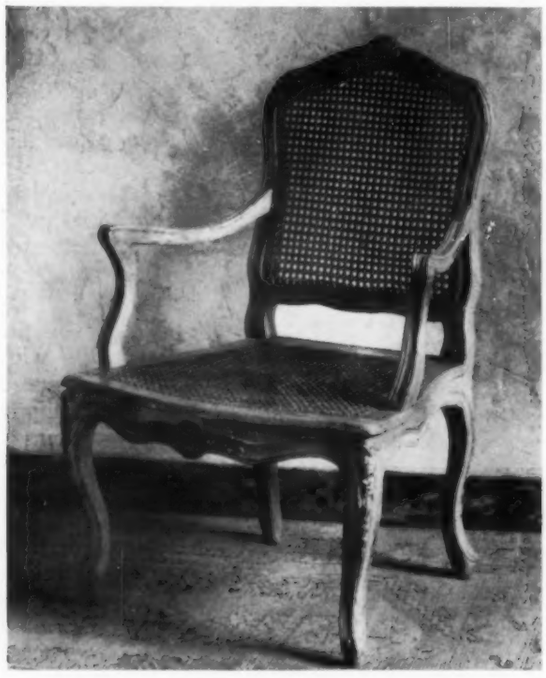
Delano & Aldrich, Architects

An English room of the first half of the 18th century, in pine paneling. The furniture is grouped about the fireside, complementing the chimneypiece, and the comfort of this group is increased by the very small projection of the breast. A few small tables grouped with the upholstered chair or sofa would increase the effect of livableness and comfort

Louis XV chair should not be of gilt covered with satin, but of oak or walnut covered with needlework or velvet, and thus it would be related in material and contrasted in form. Introduce horizontal planes of furniture to contrast with the vertical lines of the walls—commodes and consoles of about uniform height, settees and chairs and tables likewise. This principle explains the low commode as generally more acceptable than the high type of furniture.

For the wall decorations, probably nothing is more characteristic than the built-in mirror over the chimneypiece, and upon other axes of the room. Hung in a formal manner, portraits, architectural landscapes, Venetian scenes and other kindred subjects employed by the eighteenth century artists are very valuable material. Although extremely difficult to arrange, small miniatures intimately grouped are typical and create a delicate and charming touch characteristic of the bygone age.

Again, the smaller pieces should be arranged around the large, and if possible all pieces should be experimented with in the room before arriving at a decision. Pairs of antiques are desirable and excellent for balance. The intrinsic value of the individual piece of a pair is greater than that of a single piece of the same design. The commode, very characteristic of this period, is almost indispensable from a decorative viewpoint and is also useful. Marble tops to furniture are also characteristic and create an air of elegance. At least four side chairs are advisable even in the smaller rooms. Generally they are the only chairs that can be easily and comfortably grouped around a bridge table, as well as increasing one of the conversational groups. Complete sets of furniture indicate a lack of thought and create a hard, set appearance, void of interest. The large, all-upholstered sofa and chairs as well as the long table are too heavy and cumbersome for the scale of this period. The deep armchair or settee with an interesting exposed wood frame, with good upholstering, is as comfortable and often more so than the heavier all-upholstered pieces.

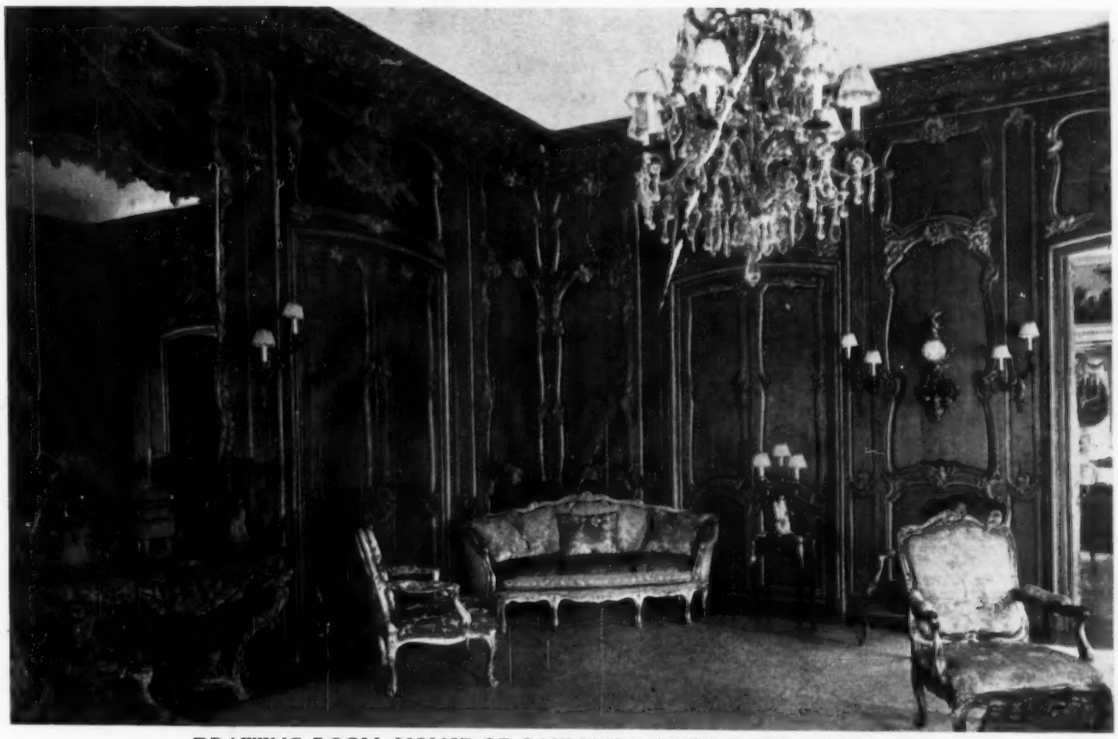


A Painted Louis XV Chair Shown in Measured Detail
Courtesy of Henry Forbes Bigelow, Architect

COLOR. The problem of color and fabric is least understood by the architect and best comprehended by the decorator by reason of their respective trainings. To equip himself for successful decoration the architect must give to color study and research. I would advise the student to acquire a thorough understanding of the simple theory of color, and in his first commissions to adhere closely to the principles laid down. When these are mastered, he should allow his fancy a free rein, and play his color as humor or inclination dictate and be guided by his instinct or good taste. Full intensity of color may be used successfully in small areas, whereas backgrounds should never be so. However, be not afraid of colored walls, as they produce most interesting rooms, particularly after the abundance of gray walls that greet us everywhere. Few realize that color and its distribution are as typical of the periods as is form, and because of the small number of works which are available it is extremely difficult to acquire a thorough knowledge of the subject. A trip to Europe, studying exclusively at first hand period color, fabrics and furniture, is the surest means of learning this art. If this be impossible, the museums and antique shops offer endless opportunities, and many old rooms in the original color may be studied. When the peculiarities of period color and period application of color are understood they will prove of great value for unusual expression.

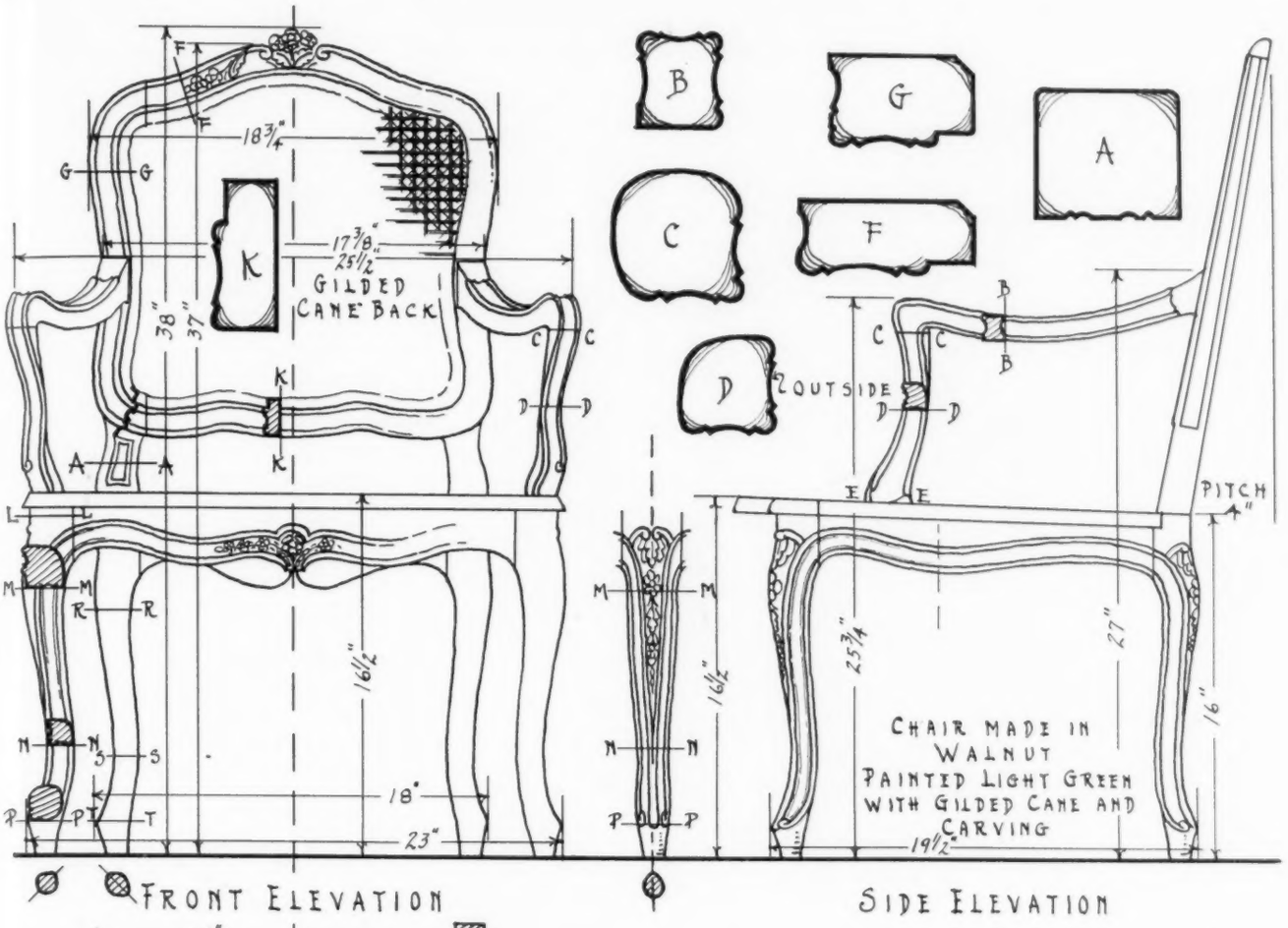
During the eighteenth century the art of marbleizing became very popular and its use created many interesting and highly decorative effects and imaginary marbles. Even in staid little masterpieces such as the Petite Trianon it was common practice to marbleize the wood bases to match the marble of the chimneypieces. In America the floors were frequently painted blue, red or yellow, producing a very interesting and quaint effect.

Bizarre color schemes are apt to make for notoriety—and then the morgue, for only the sane can survive. Color has such enormous variations both in itself and in its possibilities of distribution that a particular color scheme need never become hackneyed. I suppose no color scheme is more commonplace than red and green, but I have never tired of using or living with it. Avoid extreme color schemes that are in vogue, for they are of short life and hence generally mean a discontented client. I recall that several years ago nine out of ten people doing over a room were using black and white. A year or so later those who could afford



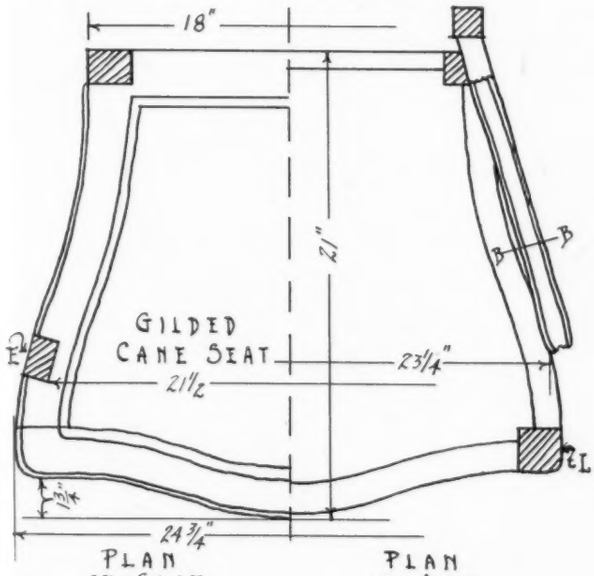
DRAWING ROOM, HOUSE OF OAKLEIGH THORNE, ESQ., NEW YORK
ALBERT JOSEPH BODKER, ARCHITECT

DETAIL OF LIVING ROOM, APARTMENT OF WILLIAM M. ODOM, ESQ., NEW YORK
WILLIAM M. ODOM, DECORATOR



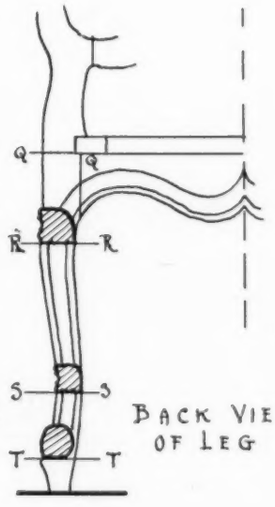
FRONT ELEVATION

SIDE ELEVATION

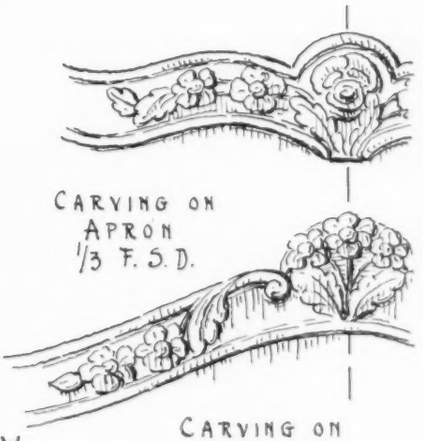


PLAN OF SEAT

PLAN OF ARM

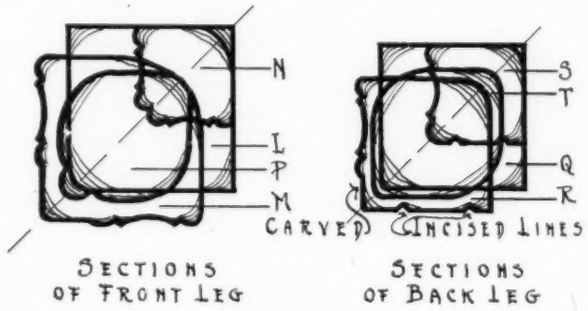


BACK VIEW OF LEG



CARVING ON APRON 1/3 F. S. D.

CARVING ON BACK 1/3 F. S. D.



SECTIONS OF FRONT LEG

SECTIONS OF BACK LEG

LOUIS XV ARMCHAIR

FROM THE COLLECTION OF

MR. HENRY FORBES BIGELOW

BOSTON MASSACHUSETTS

FRENCH – PAINTED WALNUT – 1770

ELEVATIONS – SCALE 1½"=1'-0" SECTIONS ½ F.S.D.

MEASURED AND DRAWN BY RACHEL C. RAYMOND.

Reception Room in House of Oakleigh Thorne, Esq.
Albert Joseph Bodker, Architect
A well handled and characteristic example of Louis XVI paneling. The overdoor paintings enhance the vertical effect of the doorways and the large painting balances the chimneypiece

it were redecorating these same rooms differently.

FABRICS. Other factors of importance besides that of color are to be found in the fabrics. Those of the design, the period and the scale will be understood by the architect, while those of the material and quality of the material will offer a new field for thought and study. Various materials are typical of various periods. The taffetas and satins were much in vogue during the eighteenth century but the rich silk velvets of this century were a characteristic note in the earlier centuries.

The quality of the materials should be the quality of the other decorations. If a few notes of linen or chintz are introduced the appearance of "dressiness" will be eliminated. The scale of the design in the fabric must be in harmony with the size of the room and in harmony with the furniture it is to be used upon. The predominating fabric will likely be used in the window hangings, and other fabrics should be related to it. This hanging is more dignified if it is not reintroduced, although it is advisable to repeat the color elsewhere. A fabric of less importance should be repeated in several places. Contrast adjoining fabrics either in color, design or material.

It is essential that a balance of color be created in the room, and often a most interesting solution is a triangular grouping. For reference and record it is an excellent idea to form a color chart of each room by affixing cuttings of each fabric and color of the painting upon a paper mount. This chart should be carefully filed, as it is likely that the room will require additional materials in subsequent years, and in this case it will prove of great assistance in the selection of added furnishings.

Living Room in House of Egerton Winthrop, Esq., Syosset, Long Island
Delano & Aldrich, Architects
An interesting room of the style of Louis XVI, with chintz wall covering characteristic of the period and relieved by taffeta curtains. The grouping of two windows at the end of the room with space for the commode between is excellent. The furniture is well grouped around the French chimneypiece, with typical mirror over it, and an atmosphere of comfort has been attained

THE EDITOR'S FORUM

PRIZES OF ROME IN ARCHITECTURE, SCULPTURE AND PAINTING

THE American Academy in Rome announces its annual competitions for fellowships in architecture, sculpture and painting. They are each for a term of three years, with a stipend of $3,000 for travel. Studio and residence at the Academy are provided free of charge and board is given at cost. The competitions, which will be held in various institutions throughout the country and which will probably begin in late March or early April, are open to all unmarried men, citizens of the United States. Entries will be received until March 1. Anyone interested should apply for detailed circular information and application blank to Roscoe Guernsey, Executive Secretary, American Academy in Rome, 101 Park avenue, New York.

AMERICAN ARCHITECTURE THROUGH ENGLISH EYES

THE various English architectural publications which come to our office frequently gratify us by their frankly expressed appreciation of work being done in America. Apropos of an exhibition of photographs and sketches of American architecture recently opened in London, the *Journal of the Royal Institute of British Architects* makes these observations:

"If Paris gives the finest architectural training in the world, it is America that provides the opportunities for practice, without which we should never know the value of that training. For architecture as learned in Paris and practiced in the United States is a very wonderful thing. It is the most alive of all the arts, and considerably the most important, for there is no expression of American life so complete as its architecture. For these reasons the exhibition of American architectural work now open at the galleries of the Institute is of the greatest importance. The selection is confined to buildings erected within the last 20 years, by the leading architects of our time.

"It is well for us to recognize at once that American architects are more successful in the handling of the larger problems of design than we in England. This statement requires no qualification. The frank acceptance of the fact can be only beneficial, for it will lead us to a very careful examination of the work shown in this exhibition, and a reasoned consideration of the qualities by which it is distinguished. The time is opportune for such consideration, for London is being rebuilt, and there is a sense of uneasiness abroad as to the form that our new streets are taking—a misgiving that all is not well. It is good, therefore, that we should turn our minds to the great achievements of America in architecture, so well represented here, and make a few blunt comparisons with conditions in England."

While highly appreciating the praise which our English cousins so freely accord us, and while thankful for the talented architects whose work has earned the praise, we nevertheless understand full well that such would not have been possible had it not been for the training and grounding in architectural design and practice which American students have received from France and England.

CALIFORNIAN ACTIVITIES

THE Stockton Association of Architects has started a campaign to lower the cost of building and has presented a petition to the Building Trades Council and the Building Trades Craftsmen of the city of Stockton, asking a 12½ per cent reduction in all building trades wage scales, to take effect January 1, 1922. They have also taken up the matter of price reductions on those materials which have not shown a sufficient percentage of reduction since the peak. With this in view, the architects have pledged the Association not to specify materials that are held at exorbitant prices where substitutes can be found, and not to specify any material handled by a manufacturer or dealer who is putting exorbitant prices on his products. The matter of illegal combinations of dealers and manufacturers in restraint of trade is also being taken up with the federal authorities. There is also to be held, January 21 to 28, under the auspices of the Association, an architectural and building material exhibit. A comprehensive line of building materials is to be exhibited, showing all new and modern building materials and new and economical methods of building construction and a large exhibit of architectural drawings, photographs and models. The president of the Stockton Association of Architects is Glenn Allen, 37 South Aurora street, Stockton, California.

AN EXHIBITION OF TEXAS WORK

THE first of what is intended to be an annual exhibition of Texas work will be opened by the Dallas Architectural Club at the Jefferson Hotel, beginning February 11 and lasting one week. The exhibition committee invites the submission of examples of work, including photographs of executed work, drawings, renderings, sketches or models which illustrate architecture, sculpture or decoration. All drawings must be framed, mounted or neatly matted; color mats are preferred and exhibits should reach Dallas not later than February 6. The exhibition committee may be addressed at the Jefferson Hotel, Dallas, Texas.

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Some call them veneered. They are more than veneered.

They are ***built up*** doors. Built of soundly seasoned wood with the grain of the core and face running in opposite directions. If one starts pulling, the other begins holding back. One neutralizes the other.

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So much for what I say about our partition. Here is what The Stamford Lumber Co. of Stamford, Conn., makers of sash, doors and window frame says, in a recent letter.

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President

Telesco Partition and paneled wainscoting recently shipped us has been erected complete, and we find that it is satisfactory in every respect; in fact, it is better than we expected. Our customer is more than pleased. He realizes he has a good job.

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THE EDITOR'S FORUM

THE FOUNDING OF THE ASSOCIATED TECHNICAL SOCIETIES OF DETROIT

EVIDENCE of the growing spirit of co-operation between technical societies within the various professions is seen in the definite affiliations which have been arranged in a number of cities within the past few years. This is a most encouraging sign of the broader viewpoint that the professional man is taking with reference to matters of public policy where his advice and active participation will exert an influence for great good. In Detroit the professions have taken the most recent action along these lines and we are advised that the matter was taken up seriously in June, 1921, by the organization of a Temporary Council composed of two delegates from each of the several societies interested. The affiliation is now an accomplished fact, taking effect January 1, 1922 by the ratification of these twelve societies: Detroit Section, American Society of Civil Engineers; Detroit Chapter, American Association of Engineers; Michigan Chapter, American Society of Heating and Ventilating Engineers; Detroit Post, Society of American Military Engineers; Detroit Section, American Society of Mechanical Engineers; Detroit-Ann Arbor Section, American Institute of Electrical Engineers; American Institute of Chemical Engineers; Detroit Engineering Society; American Chemical Society and Detroit Chemists; Michigan Chapter, American Institute of Architects; Detroit Section, Michigan Society of Architects; Detroit Chapter, American Society for Steel Treating.

The Permanent Council met and organized December 13, 1921 and elected officers for 1922 as follows: Chairman, P. W. Keating; Vice Chairman, A. A. Meyer; Secretary-Treasurer, Walter R. Meier.

The engineers, architects, chemists and other technical men of Detroit have for some time appreciated the need of one central association to represent their combined interests. A central office will now be established for conducting the business of the several societies. In the past, the several societies each held a number of meetings throughout the year and frequently they occurred on the same dates. This conflict of dates will hereafter be avoided as the office of the new association will schedule the dates of meetings of all the technical societies. The Associated Technical Societies of Detroit will hold one meeting each month and this meeting will be under the management of one of the member societies. This member society will provide the speaker on a broad subject of interest to the members of all the technical societies.

The paramount use of the new association to its members and to the public is its opportunity for public service both for the city of Detroit and for the state of Michigan. The association will take an active interest in all matters wherein engineering, architectural and technical subjects are an important factor. The Council will study the opinions of the membership and will assist in furnishing definite and accurate information to the public. The association will offer its assistance and advice to city and state officials whenever required.

1922 ARCHITECTURAL LEAGUE EXHIBITION

THE Annual Exhibition of the Architectural League of New York takes place this year in the Fine Arts Building, at 215 West 57th street. The public exhibition continues from February 5 to March 4.

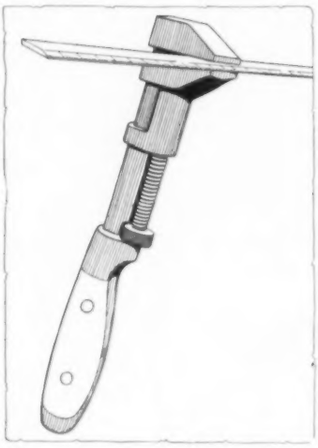
The exhibition will include as in former years drawings and models of proposed and executed work, both in architecture and the allied arts; also specimens of decorative painting, furniture, metal work and ceramics. There is especial interest throughout the country in the League Exhibitions because of the definite attempt that is made to supply them with a character that will have a public appeal. This object has received the careful thought of many prominent New York architects and the results are indicative of what can be accomplished in other cities. The League is very active in its encouragement of craftsmanship and good design in commercial products that find a use in architecture, and examples of this work are always featured in the exhibitions.

MEDAL FOR ARCHITECTURE IN BOSTON

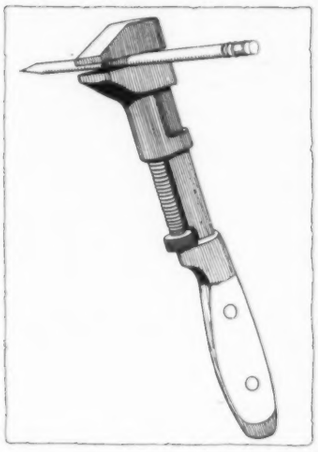
AN attempt to stimulate architectural merit in private and public buildings, monuments and other structures in Boston is revealed in the presentation to the city by J. Harleston Parker of Parker, Thomas & Rice, architects, a gift of $1,000, the income from which is to be used for the presentation of a gold medal to architects deemed worthy of it from time to time.

Mr. Parker wishes the medal known as the Harleston Parker Medal, in honor of his late father, a citizen of Boston, and stipulates that it shall be presented by the mayor, with the approval of the Boston Society of Architects or its successor, to the architect or firm of architects erecting the most beautiful piece of architecture within the limits of the metropolitan district. It is the intention that the award be made each year and in no case at more than a three-year interval.

The city has accepted the gift, and it is hoped that as the years go on the medal will exert a very real incentive toward better architecture and be prized by architects as representing the greatest compliment that can be paid them by the fellow members of their profession.



Which Grips Tighter?



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So much for what I have to say about the satisfaction you get from Telesco Partition.

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President

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The Pontiac Nursery Co.
B. J. Manahan, Mgr.

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THE EDITOR'S FORUM

AN ACT FOR STABILIZING BUILDING AND GENERAL INDUSTRY

AN important movement which resulted from the President's Conference on Unemployment, held during November, was expressed in a bill introduced into Congress by Senator Kenyon of Iowa, regarding the planning and carrying out of public work.

This bill makes recognition of the benefit to the public which would follow the prosecution of such work during periods when labor and capital are not fully employed in private industry, rather than when private building is to the fore, competing for the same materials and workmen that would be required for public work. It is fully evident that such a policy upon the part of the government would aid in stabilizing industrial conditions, particularly during periods of depression.

Furthermore, the bill recommends that the approach of periods of industrial depression be forecast, as far as possible, by the Department of Commerce, and that this department publish monthly reports, as a supplement to the *Current Survey of Business*, concerning the trends of business conditions, the approach of periods of business strain and over-extension, or of probable times of depression, in order that the president, governors of states, mayors of cities, and also those engaged in private industrial enterprises may properly prepare and plan for such periods. Finally, the bill provides that the head of each executive department, with the advice of the president, be authorized to postpone the date of the commencement of building within his jurisdiction or to retard its prosecution as may be necessary or advisable in order to prepare for and to prevent a further rise in the cyclical wave of industrial expansion and resulting business strain, and by entering upon a program of public building to counteract an impending period of unemployment.

Proofs of the practicability of stabilizing economic conditions relating to building are not lacking. In 1921, when private industry was employing a small percentage of laborers, as far as can be judged from available statistics, public work engaged the services of twice as many as ever before. The war had checked public building in much the way the Kenyon bill is expected to do in times of peace. Consequently the necessary appropriations were made and work could be started. Different municipalities prepared to do six hundred million dollars' worth of work more than ever before, a total of twelve hundred million when private building was almost at a standstill. Another proof is more striking. Heretofore the bulk of road construction has been done during a few months in the summer. Now for the first time manufacturers of different kinds of road machinery report that they received in December orders which formerly did not reach them until April, earlier work thus being made possible. In many states road materials are being placed on the ground during the winter months, thus giving employment during a time when ordinarily a contractor's men and teams would be idle. The passage of the Kenyon bill will do much to remedy the fluctuations of industry.

DEATH OF A GREAT ENGLISH ARCHITECT

ARCHITECTURE in England has suffered a severe loss by the death, on January 25, of Ernest Newton.

His eminence as an architect lay chiefly in his treatment of domestic architecture, in which he was singularly successful. Mr. Newton was president of the Royal Institute of British Architects during the critical years of 1914 to 1917. He was elected A.R.A. in 1911 and R.A. in 1919, and he was one of the architects engaged upon the building of Whiteley Village which is described and illustrated elsewhere in this issue of THE FORUM.

APPRAISAL SERVICE BY ARCHITECTS

THE Illinois Society of Architects announces the formation under its auspices of a board of architects, experienced in designing and construction of buildings of different types, to render valuations. Appraisals made by this board will be a safeguard to owners or to prospective purchasers, and since such valuations will represent the combined judgment and experience of the board's full membership the results are certain to be more dependable than when made by individuals.

This would seem to be an activity well within the scope of professional service and one calculated to be influential in bringing about a wider recognition upon the part of the public of the architect's practical usefulness and his ability to appreciate the economic aspect of building.

REUNION OF ATELIER MASQUERAY STUDENTS

DURING April there is to be held a reunion of students of the Atelier Masqueray. Considering the influence that Masqueray exerted in the training of many draftsmen and the pioneer work which he did, particularly in Beaux Arts training, this reunion could hardly fail to be interesting and it should attract many men who are now eminent in the architectural profession.

Arrangements for the reunion are being made by L. E. Jallade, 129 Lexington avenue, New York, who would be glad to have names and addresses of former students of the Atelier Masqueray.

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Henry Klein
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THE EDITOR'S FORUM

ENFORCEMENT OF JURISDICTIONAL AWARDS

THE Associated General Contractors of America, The American Institute of Architects, The Engineering Council, The National Building Trades Employers Association, and the Building Trades Department of the American Federation of Labor through the National Board of Jurisdictional Awards, which has just concluded its regular quarterly meeting in Washington, have reached a national agreement through a resolution heavily penalizing union workmen who refuse to abide by the decisions of the Board.

This action has been taken as the result of the report of a special committee of the National Board appointed to outline the procedure to be followed in clearing up the situation created by the refusal of the United Brotherhood of Carpenters and Joiners to conform to the decisions of the Board in the case of settling the dispute between the carpenters and the sheet metal workers which was decided in favor of the latter. This dispute involved the setting of sheet metal trim on doors and windows. The carpenters have refused to abide by the decisions and have called strikes and suspended work on big construction jobs in many parts of the country, causing serious trouble and unemployment in other trades.

The resolution follows:

Whereas, The United Brotherhood of Carpenters and Joiners of America has not been observing or conforming to the decisions of the National Board of Jurisdictional Awards in the Building Industry; and

Whereas, The attitude of that organization in failing to observe those decisions is seriously embarrassing owners, architects, engineers, contractors and workmen engaged in the building industry, and such a condition tends to increase costs and to cause delay and is detrimental to the public interest and the building industry in general; and

Whereas, All parties signatory to the plan of the Jurisdictional Board have been actively supporting the decisions of that Board, including sixteen of the seventeen International Unions constituting the Building Trades Department at the inception of the Board;

Resolved, That in order to correct the above mentioned conditions, the several signatories to the plan of this Board be urged to instruct their constituent members, each in its respective field, as follows:

That the members of the American Institute of Architects and of the Federated American Engineering Societies insert in all specifications and contracts for building operations a stipulation that the decisions of the Jurisdictional Board be observed;

That the members of the Associated General Contractors and of the National Association of Building Trades Employers incorporate in their agreements with their sub-contractors a provision that will secure a compliance with all decisions of the Jurisdictional Board and that the members thereof shall refuse employment to any local union or members thereof neglecting or refusing to abide by decisions of the Jurisdictional Board;

That the Building Trades Department shall instruct local councils to unseat any local union refusing compliance with such decisions, and that associated International Unions shall instruct their respective locals to extend neither recognition nor support until such time as delinquent locals accept and abide by all decisions of the Jurisdictional Board;

Resolved further, That this resolution shall be enforced as expeditiously as possible beginning with those localities in which the trouble appears to be most acute and where action seems most urgent, and that all these signatories make special and united efforts toward securing general and complete compliance with all the decisions of the Jurisdictional Board; and

Resolved also, That as and when trouble in any locality is brought to the attention of any of the signatories such organization shall take the initiative in forming a general committee of representatives from all the signatories for the purpose of dealing with the situation in that locality.

Of the seventeen International Unions that constitute the Building Trades Department of the A. F. of L., sixteen have unqualifiedly endorsed the work of the Board and supported its decisions. The carpenters' union alone, although one of the original organizers of the Board, now refuses to support it.

The purposes of this national board for jurisdictional awards is to settle difficulties between unions over what crafts shall do certain work in the construction industry by orderly and judicial procedure rather than by costly strikes. The metal trim case above referred to was under consideration for nearly a year, during which time both sides were given ample opportunity to be heard.

An important decision also finally settled at the recent meeting of the Board was that of the elevator constructors *vs.* the electrical workers as to which trade should have jurisdiction over the work of hoisting, lowering and placing of elevator machinery. The work was awarded to the elevator constructors.

The portion of the resolutions requiring architects to insert in their specifications a stipulation that the decisions of the Board shall be observed applies only in cases where union labor is employed; architects supervising work erected under open shop conditions are not affected.

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THE EDITOR'S FORUM

ARCHITECTS AND TRADES UNIONS

INTEREST in the possibility of architects taking a definite part in the consideration of present difficulties in the building industry is growing in several sections of the country. In our last issue we pointed out the need for group action by architects and indicated some of the results that might be expected, at least in localities where architects assumed the initiative. This has prompted Mr. Robert D. Kohn of New York to write us, indicating that the Congress of the Building Industry is already meeting the requirements of such an organization as we outlined:

Your editorial comment in the April ARCHITECTURAL FORUM on the subject of "Architects and Trades Unions" is very much to the point. There is no doubt whatsoever that the architectural profession has neglected this very important element in the process of building. Architects have for too many years left to the contractor the whole matter of negotiations with labor, conditions of labor, prices of labor and all the other elements affecting the production of the buildings that the architects design. You are quite right in saying that it is high time that the architect interested himself in this important function of the building industry, of which he is another functional part. But there are two points to which I want to take exception in your editorial. One is in the assumption that nothing has been done to create an agency whereby architects and labor can come together. The other is the implication in your editorial that it is only in this matter of control of labor that the architect has failed to see the industry as a whole.

As for the first point of my criticism of your editorial: This can doubtless be explained by the limitations on your space. THE FORUM has already referred a number of times to the movement known as the Congress of the Building Industry, with its active groups in Boston and New York, Portland and Seattle, and its new groups forming in other cities. A meeting held in Washington last month under the auspices of the Federated Engineering Societies and a conference held at the same time as the recent Chicago meeting of the Federation of Construction Industries; both seem to indicate that the impulses back of the local groups of the Congress of the Building Industry are now to be consolidated in a National Conference Committee of some kind which will further this idea throughout the country. It is certain that those who are working in the already existing groups of the Congress are convinced that great good is to come of these local efforts to bring together in each community all of the elements that form the constituent parts of the building industry, to discuss the functional relationships of the parts to the whole.

My second criticism really sums itself up in the point that we harp entirely too much on the wicked restrictions put upon production by labor. There is no doubt whatsoever that this is all very true, but why not talk at the same time about the restrictions put upon prices by the material manufacturers and the restrictions of production that originate at the same source, and the neglect and carelessness of general contractors, and of sub-contractors, and of architects too, for that matter? Is it only labor that has failed in modern industry? The only way to get right is to acknowledge that every part of every industry is at fault in some measure. In my recent meetings with groups of intelligent labor union leaders I have never found one who was not willing to acknowledge some of the most serious things that have been charged against them, provided I was willing to acknowledge that there were other people at fault in the industry as well as labor men. And I need not tell you that this is perfectly true. When I was in San Francisco last year I heard a good deal about the wicked and tyrannical impositions put upon the building industry by union labor, but I also heard a great many very serious charges against contractors, material manufacturers and material distributors in that district. It was certainly beyond my power to decide which was worse—labor or employers.

The architect is in a wonderful tactical position with regard to this whole problem. He can be dispassionately neutral, if he would, but he must stop parroting the old stuff about the wickedness of union labor. It is his privilege and his duty to represent the public in this matter, and to see that both sides clean up their respective houses, and that he himself, the architect, improves his relations to the other elements in the industry.

We have, as Mr. Kohn observes, referred a number of times in previous issues to the Congress and are in entire sympathy with its aims. We only regret that its activities so far are confined to a few cities and because of that limitation its influence in remedying conditions, at least with respect to labor, is greatly curtailed. Frank discussion locally of problems with all of the varied participants in building will undoubtedly bring about a more intelligent conception of the functions and need for existence of the different factors, with the result of creating a more tolerant spirit. The restrictive rules of labor, to single out one item that needs correction, are not the result of local manipulation; they are promulgated by the different national labor bodies and impose policies that the local union is powerless to change. It may seem, in a local meeting, entirely logical to suggest that a man have more than one trade so that he may enjoy more steady employment; it is against union policy, however, and there the matter must rest as far as local effort is concerned. This is so largely an age of organization that important policies of any group are determined by national representatives; this is true with regard to manufacturers, distributors and contractors, but perhaps to a lesser extent than in the case of trades unions. Effective action would, therefore, seem to require an organization of national character that would have the necessary prestige to secure impartial and enlightened analysis of these problems by national bodies. We are glad to learn that steps toward such a movement are being taken. Architects in all large centers should acquaint themselves with the Congress of the Building Industry, and in a future issue we hope to present an outline of its organization and the results of its labors to date that will aid in this.

SCHOOLHOUSE COSTS—A CORRECTION

WE regret that an error occurred in the caption of the illustration of a Boston schoolhouse plan shown on page 130 of the April issue in the article, "The Fourth Dimension in Schoolhouse Design," by William Roger Greeley, of Kilham, Hopkins & Greeley, architects. This school is entirely fireproof, in accord with the provisions of the Boston Schoolhouse Commission. General contract figures just received, exclusive of plumbing, heating and electrical work, show a cubic foot cost of 44 cents.

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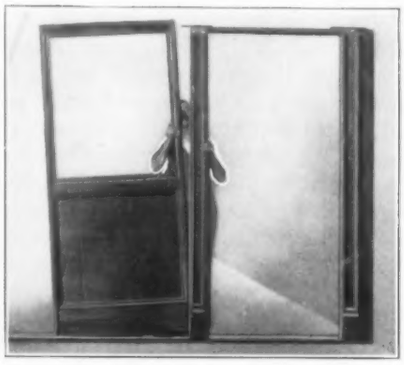

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THE EDITOR'S FORUM

ATLANTA ADOPTS ZONING

ATLANTA adopted a zoning ordinance April 10, 1922, by a nearly unanimous vote of the council. The ordinance divides the city into dwelling house, apartment house, business and industrial districts. Three classes of height districts are established with limits of 50 feet, 100 feet and 150 feet respectively. Building line, side yard and rear yard requirements are established for all buildings in the residence districts. Lot area requirements are based on the number of housekeeping units for which the residence building is arranged; 5,000 square feet of lot area per family is required for much of the dwelling house area and 2,500 square feet of lot area per family for the areas suited to double or two-family house development. In most of the apartment house areas only 625 square feet per family is required, while in the limited hotel and elevator apartment sections there is no minimum lot area requirement, though side, rear and front yards are required.

The zoning plan and ordinance were prepared for the Atlanta Plan Commission by Robert Whitten, city planner, Cleveland. The initial indifference or opposition of the public was overcome by an intensive educational campaign in which newspaper articles, editorials and cartoons played an important part. Atlanta is the first southern city to adopt a comprehensive zoning plan.

AMENDMENTS TO NEW YORK REGISTRATION LAW

THE New York state legislature has recently passed some amendments to the law for the registration of architects, principal among which is that which makes it the duty of the attorney general to prosecute offenders.

Another amendment extends the exemption period. It will now be possible for competent architects who were in actual practice in New York state prior to April 28, 1915, to obtain registration certificates without examination if their applications are filed before the end of the current year, 1922, and on condition that they satisfy the board as to their qualifications. All such architects may continue to practice without certificates if they so desire. The amendment of the law does not affect the requirement in this respect, excepting to provide that every architect practicing without a certificate shall file an affidavit that he was in bona fide practice one year before the law was enacted. A third amendment to the law requires the payment of an annual fee by every registered architect in the state. This amendment was made at the request of the regents who consider that this requirement will prevent the fraudulent use of certificates and keep the list of registered architects free from dead wood. The annual fee for re-registration is $2, payable on or before Sept. 1.

One item of interest to the profession is the definition of an "architect," now incorporated in the law, which reads: "Architect means one who designs plans for structures and superintends or supervises their construction." There is no change in the fundamental requirement of the law, that no one can practice architecture in New York state, or call himself an architect without obtaining a certificate of registration, with the exception of those who were in the practice when the law was originally enacted.

Correspondence in reference to the registration law and requests for application blanks or information relative to the law should be addressed to the Board of Examiners and Registration of Architects, Education Building, Albany, New York.

BOOKS ON DECORATION AT THE METROPOLITAN MUSEUM OF ART

AMONG the little known advantages for architects and decorators which are within easy reach of the desks or drafting rooms of those located in New York and vicinity is the collection of books and prints of ornament lent to the Metropolitan Museum by Ogden Codman.

This collection has been arranged in a special room adjoining the print room of the museum for which Mr. Codman provided bookcases and other furnishings in order that the collection might as nearly as possible be housed as it might have been in an architect's or interior decorator's working library. As the collection is intended only as a reference source for mature students and practicing members of the several professions interested, these persons have free access to the shelves. The collection was made for his own use by a practicing architect and interior decorator and contains many of the rarer and more noteworthy as well as the more familiar printed documents bearing on his art as practiced in France, England and the United States in the eighteenth and early nineteenth centuries. It is further enriched by its owner's clear-sighted utilization of the photograph to procure records of work which seems not to have been engraved in its own time.

The period in France and England running roughly from the second half of the reign of Louis XIV to the end of the first quarter of the nineteenth century, to which the collection is practically confined, is most popular for providing precedent for modern interior architecture and decoration, and the accessibility of a collection of works of this character has, therefore, a special value for architects today.

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BOOK DEPARTMENT

ARCHITECTURE AND APPLIED ARTS IN OLD SPAIN. By August L. Mayer, Ph.D. 200 pp., including 176 pp. of plates. 8½ x 11½ ins. Price $7.50. Brentano's, New York.

THE character of the arts of Spain, different from those of any other country, is due partly to the admixture of races which unites peoples of Europe with those of Asiatic origin, and partly to the geographical position of the peninsular, cut off by the rugged Pyrenees from the rest of Europe. Public appreciation in America of the arts of Spain has been long in developing, though for many years there has been a small following of enthusiasts who have built up some notable collections of antiquities and other objects of Spanish art.

In the volume just published the author sketches in general the outlines of the architecture of Spain for which the minor arts form much of the embellishment. The history of peninsular architecture is briefly reviewed and the development of the various styles described, after which the author takes up one by one the various subsidiary arts such as metal work, wood carving, tile and pottery making, fabrics, embroidery and the making of furniture, each of which is treated in a way calculated to encourage the reader to a more extended study.

This work is particularly rich in illustrations of buildings — exteriors and interiors — and of individual objects which are but little known. A number of notable wooden ceilings are illustrated,—ceilings which are among the glories of Spanish architecture,—and the book also abounds in illustrations of wrought iron grilles, either over windows in residences or else set within the arches which separate small chapels from cathedral aisles. If treatment of another subject were to be selected for particular mention it might be that including various forms of pottery — tiles of different kinds and ceramics of divers sorts, plates, apothecary jars and other objects, the development of which is one of the most characteristic achievements of Spanish craftsmanship. Many of the illustrations afford suggestions for the handling of modern buildings or for the treatment of present day interiors.

PRACTICAL STRUCTURAL DESIGN. By Ernest McCullough, C.E., Ph.D., Member A.S.C.E., Lt. Col. U. S. Army, A. E. F. 317 pp., 5¾ x 8½ ins. Price $3. U. P. C. Book Co., 243 West 39th street, New York.

IN the author's preface to this useful volume he sets forth the fact that in this book he has endeavored to put into effect what he has long claimed to be a possibility — the teaching of 95 per cent of the work done in the design of structures to men whose knowledge of mathematics does not extend beyond that taught in high schools. During intervals in a busy professional life Mr. McCullough has taught extensively in evening schools, and has prepared large numbers of draftsmen to take examinations in building design in order to receive licenses to practice architecture.

Summed up here in book form, therefore, are the matured fruits of this experience, and in eight chapters are covered the essentials of the subject, such as External and Internal Forces; Problems in Design of Beams; Girders and Trusses; Joints and Connections; Graphic Statics; Columns and Structures, and Semi-Rigid Frames, the matter made plainer and clearer whenever possible by means of diagrams and figures. While not intended solely for the use of those who of necessity must be self taught, the value of the book will be apparent to anyone who feels the need of this technical training but who is unable to acquire it in the usual schools, and to anyone who feels the need of a firmer grasp of the subject. The same effort which has been expended upon making the text informing and instructive has been given to making the diagrams and figures helpful, and the complete and well arranged index at the end of the book is another useful detail. The author's wide experience and his success in the form of teaching which he has made particularly his own would seem to be a fitting guarantee of his success in covering much the same ground through the medium of the printed word.

The purpose which this work is intended to serve has probably been responsible for the simple and, as far as possible, non-technical style which Mr. McCullough has adopted and which will aid in accomplishing the purpose for which the book was prepared.

FURNITURE AND DECORATION *of the* ITALIAN RENAISSANCE

By FRIDA SCHOTTMULLER

THIS new book is a valuable source of reference to architects and designers on the domestic phase of the Italian renaissance. It contains 24 pages of informing text on the plan and decoration of the renaissance house and detailed consideration of the various articles of furniture. There are 590 illustrations of interiors, architectural details, various articles of furniture and accessories such as metal work and fabrics, all carefully arranged in groups and presented chronologically. Excellently printed in black ink on cream paper and bound in board covers with cloth back.

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DANIEL H. BURNHAM, ARCHITECT AND PLANNER OF CITIES. By Charles Moore. Two volumes, fully illustrated, 498 pp. Price $20. Houghton, Mifflin Co., Boston and New York.

HERE in two thoughtfully edited and lavishly illustrated volumes Dr. Moore has given a biography of one of the great figures of American architecture. The author sketches the history of the Burnham family from its Puritan forbears to its removal to Chicago, then a city 18 years old. The youth of Daniel H. Burnham is described, his beginning the study of architecture at the age of 22 in the office of Loring & Jenney, and the later formation of the partnership with John W. Root.

Work in Chicago occupied a large part of Mr. Burnham's life. To him more than to any other individual was due the magnificent architectural success of the World's Columbian Exposition in 1893, a success which stimulated all the arts and which is often regarded as marking the beginning of modern architecture in America. Mr. Burnham was among the promoters of the Chicago Orchestra, and his plans for the development of Chicago have at last begun to bear fruit and may be regarded in a sense as being his most enduring monument. Other work in Chicago extended into every department of architectural effort, and as one scans the partial list of buildings which appears in one of these volumes it would almost appear that most of the important structures in Chicago were designed in his office. But Mr. Burnham's sphere of activity was not limited to Chicago. He was elected president of the American Institute of Architects in 1893, and a year later he was among the group of founders of the American Academy in Rome of which he was ever one of the most active and devoted supporters.

It is interesting to note that Mr. Burnham's success was won without some of the educational advantages which many architects enjoy and which are of such powerful help in obtaining a grasp upon the theory and practice of architecture. In his youth he failed of entrance into both Harvard and Yale, though in later life his achievements won recognition from both these universities. Travel in Europe — which means much to any architectural student — was also denied him, and not until 1896 when he was almost 50 did he cross the Atlantic. "The schools," says the biographer, "had not trained him for his lifework, nor had he been brought up among masterpieces which without consciousness on his part shaped his thought and tastes. He was a genuine product of the Middle West, ready to seize opportunity as fast as presented; always rising to the situation, mastering and dominating it. He possessed a discriminating mind which instinctively recognized the high things and which quickly absorbed from both persons and objects impressions and lessons. He never ceased to be student and learner; he never was contented until he had considered all possible solutions of a problem; but he was no laggard. He never paused in hesitation or turned back, but ever drove forward to the end. Hence it was that his life was a record not of dreams but of accomplishments.

"No man alone accomplishes great undertakings, nor is he at all times the leader in the realization of his own ideas. The successful man owes much to the spirit of his age and to the men with whom he is associated." The entire work is a record of men and events, recorded for the benefit of posterity.

DALZELL'S HOMES OF MODERATE SIZE. By Edward F. Hammel, architect. 144 pp., 9 x 12 ins. Price $4. U. P. C. Book Co., 243 West 39th street, New York.

HERE are presented for the benefit of the prospective home builder a large number of houses, small or medium sized, which have been built in different suburban localities near New York during the course of Kenneth W. Dalzell's architectural practice. The houses illustrated are of a number of types of design, among them the colonial in its various manifestations being the most used, and different materials have been employed, such as stucco and wood in the form of clapboards or shingles; views of their exteriors and interiors are given and plans are included.

The houses illustrated have been carefully designed and their plans show effective and well worked out arrangements, many of which include provision for garages, now more than ever in demand.

A HISTORY OF FRENCH ARCHITECTURE, 1661 to 1774. By Sir Reginald Blomfield. 2 volumes, 456 pp. 7½ x 11 ins. Price $25. Charles Scribner's Sons, New York.

THESE volumes supplement a previous work by the same author, "A History of French Architecture, 1494 to 1661," and carry the reader from the time of the death of Mazarin, which marked the real beginning of the reign of Louis XIV, to the end of the reign of Louis XV. During this period the history of French architecture is largely a history of royal patronage. Colbert was prime minister during the greater part of the reign of Louis XIV, and his aim was to make France supreme in the domain of art by means of state-subsidized schools and manufactories, training promising students to supply the manufactories, such as the Gobelins and La Savonnerie, and maintaining the manufactories to employ the students, all being for the glorification of French art. Added to this there was feverish activity in actual building; royalty at the behest of Colbert filled the environs of Paris with palaces or other structures, the cost of which undermined the stability of the state, and the example set by Paris was followed throughout France.

One of the most interesting sections of this admirable work is that part of Volume II which reviews the development of the French interior during the reign of Louis XV. The author presents a vivid picture of the domestic interior of the times and of the life to which it was built to afford a setting. In the eighteenth century dress, decoration and furniture were regarded not as things apart, such as a cabinet in a museum or a picture in a gallery to be considered solely with reference to individual and isolated merits, but as integral parts of a complete scheme of decoration to which the architecture of the room, its decoration, its furniture, and the dresses of its inmates all contributed their several shares. The artists of the period relied on an ensemble and cumulative effect of which one can now form little idea from the specimens of eighteenth century furniture, however beautiful, exhibited in museums and divorced from their proper environment.

In addition to a valuable review of the entire period covered there are extremely interesting and well written chapters on individual architects of note and critical analyses of their work. The volumes form a valuable contribution to the history of a brilliant and formative period of the architecture of France.

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THE ENJOYMENT OF ARCHITECTURE. By Talbot F. Hamlin. Charles Scribner's Sons, New York. 336 pp., profusely illustrated. Price $3.

THE increasing popular interest in architecture may be the cause — or else the result — of a growing literature upon the subject. Architecture manifests itself continually in everyday life and is met, in some form, at every step; its expression is not confined largely to museums, as is the case with painting and sculpture, and it is not exemplified chiefly in music halls as is music. An art of such universal application compels observation, and on the part of many beholders observation leads to interest which is directed and stimulated by a study of architecture, its history, appeal and purpose, until it becomes a source of pleasure.

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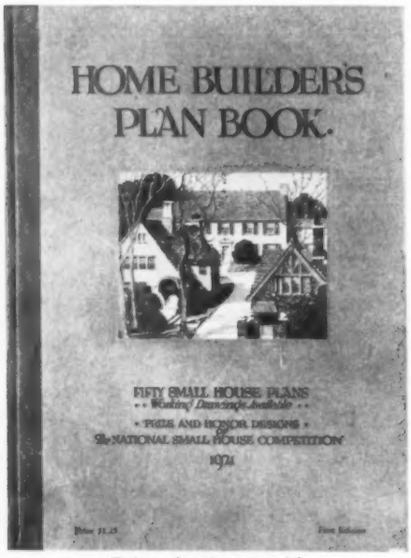

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FURNITURE AND DECORATION OF THE ITALIAN RENAISSANCE. By Frida Schottmuller. 24 pp. of text; 240 pp. of plates. 9 x 11½ ins. Price $10. Brentano's, New York.

THE growing literature for which the furniture and decoration of the renaissance form the subject matter receives a decided acquisition in this well written and carefully documented work. The author writes as one who has made a close study of the domestic aspect of the renaissance, its life and the accessories which it employed, and she traces the growth and development of the Italian interior, its furniture and accompanying decoration which is of vital interest to the architect or decorator.

After describing the forms which prevailed during the early years of the renaissance, Miss Schottmuller follows their progress through the high renaissance, and then on to the later stages, years important because of their changes in political and domestic conditions which were reflected in architecture and decoration. This work bears every evidence of care in its production. References to other works on the renaissance abound, and where difficulty of exact provenance exists sufficient data is given to enable the student to form his own judgment. While the book contains many illustrations which will be readily identified as having been used in other works,—necessary, perhaps, on account of the historical importance of what they represent or because of their influence upon the development of style,—the book also contains countless other illustrations which are unfamiliar even to many who have made a study of this most fascinating era. The plates include illustrations of admirable interiors of the period and of numerous architectural details such as mantels, architraves, doors and friezes, and of furniture—chests, choir stalls, seats or benches, credenzas or sideboards, bedsteads, tables, chairs and consoles, and of such decorative accessories as frames, needlework and textiles of various kinds. These illustrations are made even more helpful by the inclusion of six pages of memoranda which give further information regarding the items illustrated, their coloring and in many instances their sizes.

ESTIMATING BUILDING COSTS. By William Arthur. 211 pp., 4½ x 6¾ ins. Price $1.50. U. P. C. Book Co., Inc., New York.

IN these days of the high costs of materials and labor and the rapidly changing methods of construction there are few subjects connected with building which are more vital than that of correct and intelligent estimating of costs. This book, written by the author of "The New Building Estimator," is intended to act "as a feeder" to the larger work and is for the purpose of presenting in plain language to building tradesmen, contractors, material dealers and technical students the necessary fundamentals of the subject. The work deals with the methods of estimating costs of every department of building: Excavating and Piling, Concrete, Brickwork, Stonework, Plastering, Woodwork, Millwork and Glass, and so on until subjects are reached which deal with the finishing, such as Painting.

Wherever necessary to facilitate the preparation of estimates the author has included tables which give the stock sizes of different materials and their normal or approximate prices, and points which the writer wishes to describe are illustrated by diagrams. The costs of buildings are, of course, affected chiefly by the varying prices of materials and labor and this necessitates the computing of building costs in quantities of materials and number of working hours, prices being supplied to meet local conditions. The author's idea is to make this manual what engineers call "constant" and not a "variable." A chapter toward the end of the book is entitled "Hints on Drawing," included here, the author explains, because it is often necessary that contractors and mechanics know how to draw plans and that many of them find the work difficult at first. This chapter involves the use of indicating upon a plan the material of which a wall is to be constructed, a detail with which contractors and estimators should be familiar. This chapter on drawing is made helpful by the inclusion of plans of actual houses, together with sections through buildings which further explain the subject. The arrangement of a key to reviews at the end of the volume gives it added value.

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HOLLOW TILE CONSTRUCTION. A Practical Explanation of Modern Methods of Building with Hollow Tile. By J. J. Cosgrove. 198 pp., 4½ x 6¾ ins. Price $2.50. U. P. C. Book Co., Inc., New York.

THE widespread and rapidly growing use of hollow tile as a fireproofing material or for structural purposes has had the effect of constituting its use as a separate and highly specialized branch of masonry. This has naturally brought with it problems which comparatively few masons fully understand and has created a situation where an authoritative treatise which may also be used as a guide to practical building is greatly needed to promote the best use of this very adaptable material. In the preparation of this work Mr. Cosgrove has avoided what seems to be the tendency among writers to treat a subject in language so abstruse and technical that the reader is sometimes left confused or mystified as to the author's exact meaning. The text of this book is simple and to the point and is fully illustrated with specially drawn diagrams, or in some instances with perspective drawings where their use would seem to make even more understandable the details of construction which the writer wishes to emphasize.

Among the valuable features of this work are numerous tables which give important data on such subjects as: shrinkage of timbers; stock sizes of hollow partition tile; weight per square foot of porous and semi-porous tile, and the carrying capacities of load-bearing tile walls and arches.

INSIDE THE HOUSE BEAUTIFUL. By Henrietta C. Peabody. 70 pp., 9 x 12 ins. Price $3. The Atlantic Monthly Press, 8 Arlington street, Boston.

FROM the wealth of material dealing with the planning, building and furnishing of the home which *The House Beautiful* presents year by year, this selection of pages has been made. While prepared primarily to meet the needs of home builders and furnishers, the volume abounds in helpful suggestions to architects and decorators, for its illustrations portray results which have been actually secured by the use of different materials and by the adoption of various methods of furnishing and decoration.

The book is arranged in 11 sections, each dealing with rooms of some one class or with some specific detail of decoration. Halls, living rooms, dining rooms, bedrooms and kitchens receive consideration under their several headings, and other sections are devoted to the discussion of wall and floor coverings, curtains and hangings, books and their placing, and selection of lighting fitments, all problems which interest the architect or decorator quite as much as they do the laity. Particular emphasis should be laid on the fact that the interiors here illustrated and described are from houses of small or moderate cost such as are quite within the reach of the average aspiring home owner. Many of the most interesting interiors are from houses which have been successfully remodeled, and many helpful ideas are given as to the possibility of altering buildings of indifferent character into homes at once beautiful and practical.

The illustrations deal with interiors of a wide range of types, but possibly the chief emphasis is placed upon the use of the colonial style which possesses a perennial interest for American domestic use.

SMALL HOUSES: THEIR ECONOMIC DESIGN AND CONSTRUCTION. By Ernest Flagg. 149 pp., over 50 plates. 13 x 16¾ ins. Price $10. Charles Scribner's Sons, New York.

THOSE interested in the construction of stone houses, sometimes economical in localities where stone is readily to be had, will find particular interest in this volume devoted to the small house of stone. In this work Mr. Flagg dwells upon a method of planning and building which he himself has developed and which has been followed in designing the houses shown in this book. The houses, being intended for production in some numbers, are designed upon a module system, there being a modulus or fixed unit of measure which runs through all the parts. In the preparation of designs and plans economy is effected by the use of sheets which are divided off into squares of uniform size, the module lines applying to plans, sections and elevations, and all dimensions horizontal or vertical may be ascertained by counting the squares and multiplying their number by the figure given in the table of modules on the same sheet. This use of a module system is carried out in the construction of the houses as well as in their designing. This of course is economical only where the plans are to be used again and again, in which case the processes and securing of the apparatus recommended are feasible.

The houses illustrated in this book, designed and intended to be built upon the plan just described, are of concrete faced with stone. The structures themselves are of an unusual character and suggest a studying of the old cottages in Normandy and other sections of France,—irregular as to outline and well grouped or massed, constituting a type wholly and refreshingly different from anything which has been heretofore suggested in the way of the American small house. Each cottage has been planned to present a front toward the street or road and another front facing a garden, for which the plan of even the smallest house provides. In the matter of planning, Mr. Flagg eliminates as far as possible the space generally given to halls, corridors, and particularly to stairways, which are small, often spiral, and tucked away in odd corners.

COMMUNITY BUILDINGS FOR INDUSTRIAL TOWNS. 94 pp., 6 x 9 ins. Price 75 cents. Community Service, Inc., 1 Madison avenue, New York.

THE increasing popularity of community buildings often brings such a commission into an architect's office. and this little manual on the subject gives many useful hints as to its treatment. Such buildings are of widely different sizes, suitable for towns of varying populations, and with this fact in view the book contains plans of three community buildings of quite different types and degrees of completeness of equipment, which could hardly fail to be of help to the architect; in addition, there are numerous views of the exteriors and interiors of successful community buildings and their details, such as lounging rooms, dancing rooms, "little theaters," gymnasiums, swimming pools, billiard rooms and bowling alleys.

Besides being useful to architects who may be designing such buildings for community purposes, the book will be an aid to those interested in the activities themselves, and a part of the work is devoted to outlining the fundamentals of successful organization.

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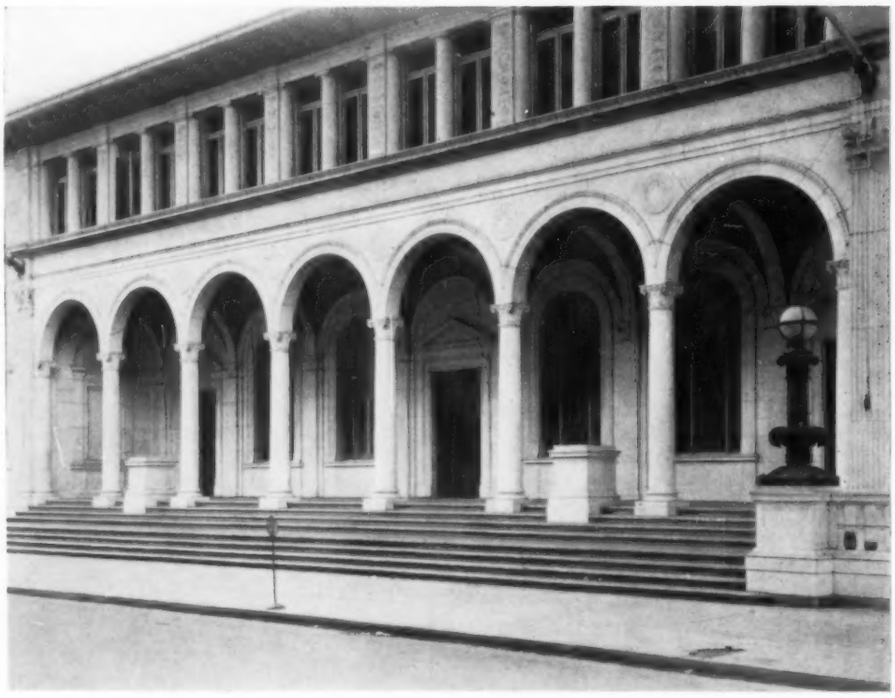

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AD QUADRATUM. A Study of the Geometrical Bases of Classical and Mediaeval Religious Architecture. By Fredrik Macody Lund. Profusely illustrated by plans, sections, views and details of notable temples, churches, cathedrals and other buildings in Greece, Italy, Germany, Denmark, France, England and Norway. Printed by order of the Norwegian Parliament. Published by B. T. Batsford, London. 2 vols. 9¾ x 12¾ ins. Price £5 net.

MODERN architecture is deeply indebted to the parliament of Norway for the publication of "Ad Quadratum," the work of an author, historian and art critic of international reputation. The book is an elucidation of architectural philosophy, called forth by the controversy waged over the reconstruction of the cathedral of Nidaros, Norway's national shrine. Fearing lest the proposed reconstruction result in one of the usual modern abortions, Prof. Lund made an exhaustive study of those parts of the cathedral still standing, in the course of which he discovered certain striking mathematical proportions, the existence of which he has since found repeated in the ecclesiastical architecture of all ages.

It still is fashionable for architects to "sit in the seats of the scornful," and smile at any attempt to produce architectural beauty by geometrical means, but books like "Ad Quadratum" foreshadow the time when these seats will have to be vacated, and perhaps more precipitately than gracefully! Dissecting temples and cathedrals like a comparative anatomist, Prof. Lund has laid bare a common skeleton plan, based on series of squares, cubes and pentagons, uniting all ecclesiastical architecture from Solomon's temple on, into one great family of "Quadrata."

For centuries mankind has stood in awe before the temples and cathedrals of earlier ages, while criticism vanished in the worship of beauty. Although architects of our time have done their best to live up to classic tradition, they have succeeded only in the details. Every honest critic is sensible of the lack, and the greatest architectural minds of the last century have occupied themselves with the reason for this failure, striving for the rediscovery of the scientific basis of the art of architecture. The few architectural drawings handed down from the middle ages and the scanty documents of the building guilds merely hint at geometric methods of design, either because the philosophy symbolized by their designs was a guild secret, or a knowledge of it was assumed to be the common property of all builders.

In "Ad Quadratum" Prof. Lund claims to have rediscovered this philosophy and the geometrical principles underlying its expression in architecture. Whether he has given us the final word, the future alone can decide, but there can be no doubt that he has directed a powerful searchlight upon the middle ages.

The diagrams are elaborately worked out. The author does not stop with squares and diagonals, as do his predecessors in this field, but considers the pentagon and pentagram most important construction figures, and his numerous drawings are covered with these to such an extent that he can say, "When the pious mediæval worshiper stepped inside the porches of the transept, or followed the long processions through the nave porch, he came into a wonderful world of imaginary pentagrams, around the altar, in the sanctuary, high up between the spires, and over the roof of the church where chancel and church meet—the symbol of creation and of the miracle of life in ancient and Christian times." (p. 76.) But he goes further. In the chapter on the "Sectio Aurea" he gives us one of the most interesting compilations of the many early statements of this remarkable law and an exhaustive history of its origin and application to classic buildings.

Prof. Lund regards ecclesiastical architecture, from the Temple of Solomon on through Greek temples and mediæval cathedrals, as the architectural expression of the Greco-mediæval philosophy of the harmony and beauty of the universe, embodied in mathematical laws and symbols. Armed with this theory not only has he conquered his opponents and saved Norway's

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national shrine from being reborn a monstrosity, but to quote his own words has "sent back to its proper place, to darkness and chaos" the modern view of art which "turns architecture into a matter of feelings,—a mixture of sentimentality and stupidity."

The architect who, to any degree whatever, endeavors to infuse beauty along with utility into his work, cannot afford to neglect the study of the principles of proportion laid down in this book and its predecessors. As the carpenter's knowledge need go little beyond the square and triangle, so many an architect may be satisfied with using the simple fundamental principles elucidated in "Ad Quadratum," but the man of culture and learning will find here a wealth of thought, the digestion and application of which he will recognize as one of his duties. Prof. Lund is an exponent of higher mathematics; his exposition will appeal chiefly to the trained philosophical mind. What is now needed is a masterly version of "Ad Quadratum" in "words of one syllable."

ITALIAN RENAISSANCE FURNITURE. By Wilhelm von Bode, translated by Mary E. Herrick. 47 pp. and 134 illustrations. 7½ x 10 ins. Price $4. William Helburn, Inc., 418 Madison avenue, New York.

THE popular and increasing interest in Italian renaissance architecture, and the furnishings which the architects and craftsmen of the times designed to go with it, owes much of its growth to various books upon the subject. In 1902 Dr. Wilhelm von Bode published the original edition of which the volume here reviewed is a reprint, made necessary, as the author observes in the introduction, by "the lively interest in Italian furniture."

More than is true of furniture of some of the great periods, that of the Italian renaissance depends for its effectiveness largely upon the character of its surroundings. The architects of the period possessed a marvelous understanding of the relations between movable objects and the walls, ceilings and other details which made up the setting, so that it is impossible to study intelligently the furniture of the renaissance without studying as well the interior architecture which went with it, and while this volume is concerned chiefly with furniture enough is said of interior architecture to give the student a fair grasp of the subject.

Dr. von Bode makes it plain that each of the large cities of Italy possessed its own local version of the renaissance, each version holding its particular interest for the architect or decorator, though the differences are subtle and might easily be overlooked by the unobserving. These variations of style or type were especially marked in the development of the table and the cassone or chest, also in the different forms which were given the chair.

The formation of a trained and accurate taste in period furniture depends mainly upon two things,—study of authentic pieces of the time, which in this day of museums and private collections is within the reach of many, and study also of authoritative works upon the subject which may even more readily be seen at most of the libraries. But each student will find that a collection of photographs and illustrations from magazines is a powerful aid in obtaining a matured and settled view of the subject, and securing this view is further helped by the possession of books upon the topic.

ARCHITECTURAL RENDERING IN WASH. By H. Van Buren Magonigle, F.A.I.A. 160 pp., illustrated. 7½ x 10 ins. Price $5. Charles Scribner's Sons, New York.

THE reading of this book may not make a genius in the way of a producer of renderings out of an architectural draftsman, but we venture the assertion that a study of its contents and an application of its precepts will go far toward accomplishing that desirable end. As Mr. Thomas R. Kimball observes in the preface, this book presents its author in the diverse capacities of architect, draftsman, painter and writer, of whose work the architectural draftsman will be the chief beneficiary, though posterity will also share in these benefits in that because of the book impetus may be given which will strengthen and foster what might otherwise become one of the lost arts.

Mr. Magonigle says that the work is written from the point of view of a beginner who knows little about rendering but who wants to find out. With this in view the book takes up the teaching of rendering at the very beginning and through eight chapters follows the subject, covering the various phases of medium and technique. The making of rendered drawings is not work which is likely to be attempted by a novice at drafting, but a student who has attained to a proficiency which would inspire a desire to undertake rendering would unquestionably be able to draw considerable valuable help from Mr. Magonigle's pages.

As an example of what a well executed rendering should be and also to establish a high mark toward which the student should aim, the book includes reproductions of 22 renderings—one in color—by the author, Paul Philippe Cret, Hubert G. Ripley, Jules Guerin, Otto R. Eggers, Ernest Piexotto and a number of others. Probably a renderer like a poet may have to be born and not made, but even a poet must learn the grammar of the language which is to be his medium and in much the same way this work may be regarded as the grammar or textbook of the art of producing rendered architectural drawings.

A STUDY OF THE EFFECT OF MOISTURE CONTENT UPON THE EXPANSION AND CONTRACTION OF PLAIN AND REINFORCED CONCRETE. By Torato Matsumoto. Bulletin No. 126. Published by the Engineering Experiment Station, University of Illinois, Urbana, Ill.

THE investigations of the properties of concrete hitherto conducted have had to do chiefly with its strength, but closely related to the strength of concrete are the effects produced upon it by moisture and changes of temperature. Reinforced concrete has practically the same coefficient of expansion as steel where temperature changes are concerned, so that the two materials contract or expand together, but moisture has no effect upon steel. Unlike steel, concrete expands when it absorbs moisture, much like clay, wood or certain other substances.

This study into the effect of these conditions upon concrete is the work of an engineer engaged in the construction of harbor works on the island of Formosa. Owing to the conditions which prevail in this tropical region the durability of a substance exposed to the sea air and to constant climatic changes is a matter of much importance, and the result of the investigations recorded in this Bulletin have an application as wide as the constantly broadening sphere of concrete's use. Copies of this Bulletin may be had without charge.

Small Houses of the Late Georgian Period

By STANLEY C. RAMSEY

A volume on the small country or suburban houses and town houses, detached or in rows, of the late eighteenth century type, suitable for American use today. The houses shown include those of stone, brick, stucco or clapboards and most of them are designed in the dignified, slightly formal style which marks the Georgian period; some of the buildings contain shops on the ground floors with living quarters above. The volume also contains illustrations of doorways, porticoes, balconies and wrought ironwork of the time.

This book contains no fewer than 130 carefully selected examples of small houses, all finely reproduced to a large size from photographs specially taken for the purpose.

Apart from its immediate practical utility, this book is of distinct educational value, and it will make a strong appeal to all architects, students and general readers who are interested in the Georgian period.

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THE PRESENT STATE OF OLD ENGLISH FURNITURE. By R. W. Symonds. 132 pp., 156 illustrations. 10 x 12 ins. Price $20. Frederick A. Stokes Co., New York.

THE architect or decorator interested in the use of old English furniture will derive almost as much benefit from this work as the collector, for whose use it is primarily intended. The golden age of English furniture was that which covered the sixteenth, seventeenth and eighteenth centuries; little furniture is apt to be found made prior to that period, while soon after 1800 furniture making, together with most of the arts involving taste in design, fell to a low level.

From the point of view of one who has made a long study of English furniture are written the chapters relating to color and patina, design and ornament, workmanship, present condition and restoration. The author's treatment of the subject is divided broadly into divisions in which are discussed the uses of oak, walnut and mahogany. The use of gesso for forming the foundations upon which gold was applied during the Georgian period is dealt with, and in connection with gold furniture Mr. Symonds touches upon the work of William Kent and a few other architects of his school, and as is necessary in any book treating of furniture which is closely related to the customs of its times, this volume makes more or less reference to the history of the period and to the decorations and accessories which were in use.

COLLECTED PAPERS ON ACOUSTICS. By Wallace Clement Sabine. 279 pp., 7½ x 10½ ins. Price $4. Harvard University Press, Cambridge, Mass.

INTO this volume have been gathered many of the papers upon the subject of acoustics which were written by the late Prof. Sabine for various architectural journals, together with other articles hitherto unpublished. Unless an architect has been confronted with a problem which involves the assured provision of certain acoustical properties he can have but little idea of the difficulty of planning to insure these required results. The science of acoustics has not yet reached a stage of development which would entitle it to rank with the sciences known as "exact," and unfortunately the acoustical properties of a building cannot always be judged until the structure is completed, furnished, and in some instances even occupied by an audience. It is always easier to explain why a method does not work than to know in advance whether it will or will not, and it is especially easy to explain why it does not work when one is not under the immediate necessity of correcting it or supplying it. To add to the difficulty of insuring proper acoustics, there are constant changes in the use of materials employed for building, fireproofing, ventilating, etc., and introduction of new materials the acoustic properties of which are generally an unknown quantity.

The author deals thoroughly with this complicated subject, treating at considerable length such of its divisions as Absorbing Power of Wall Surfaces, Fabrics, Cushions and Floor Coverings; Absorbing Power of Audiences; Reverberation; Effect on Acoustics of Required Seating Capacities; Effects of Air Currents and Temperatures; Correction of Acoustical Defects in Existing Buildings, and a valuable section is that on Insulation of Sound, which is important in buildings of many kinds.

The science of acoustics has been considerably developed during recent years, the late Prof. Sabine himself being one of its most successful exponents, and this work places in a form permanent and readily accessible the result of his researches and investigations.

HOUSE & GARDEN'S BOOK OF HOUSES. Edited by Richardson Wright. 110 pp., 9¾ x 12¼ ins. Price $3. Condé Nast & Company, New York.

HOUSES of every type popular in suburbs or country are represented in this book which contains more than 300 illustrations of homes, large and small, plans, and views of service quarters, garages, and such important architectural details as doorways, fireplaces, windows, floors, walls, ceilings, closets, stairways, chimneys, etc. The book is arranged in three general divisions which include (1) the houses themselves, (2) exterior and interior architectural details, with views and the requisite plans, and (3) the arrangement of garages, service quarters and accessory buildings of different sorts, considered in their relations to the place as a whole.

One of the most powerful aids in visualizing the home is to see what others have done elsewhere and to obtain an idea of the possibilities held forth by each of the various house types. A prospective builder in country or suburb who is weighing the relative merits of different types of houses and the materials of which they may be built would find himself repaid many times over for the amount of money he might invest in a book such as this. With but a few exceptions the houses illustrated are of what is generally known as "average" or "moderate" cost. It is not difficult to secure results in building and furnishing when lavish expenditure is possible, but often the most interesting houses are those worked out under the handicap of a limited appropriation.

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SMALL FRENCH BUILDINGS. By Lewis A. Coffin, Jr., Henry M. Polhemus and Addison F. Worthington. 275 pp., fully illustrated, 8 x 11¼ ins. Charles Scribner's Sons, New York. Price $10.

MANY centuries of effort and achievement in architecture have made France a vast treasure house of design from which architects allover the world have freely drawn, but the wealth of Gothic cathedrals, monumental civic structures and buildings of other types has somewhat overshadowed the richness of material of other kinds, notably of the minor buildings, domestic and otherwise, which fill every province of France not devastated by war.

Into this volume the authors, themselves practicing architects, have gathered illustrations of many of these admirable structures, selected always with an eye to their practical design value to architects. They have traveled, camera and sketch book in hand, many of those departments of France which are most full of promise,—Normandy, Brittany, Seine Inférieure, Finistère, Côte d'Or, parts of the Dordogne region, and some of the fertile valleys of the interior of France. In all the districts visited they have been careful to avoid buildings already well known, and have confined their attention to the smaller chateaux which lie off the track well traveled by tourists, manor houses, farm buildings, peasants' cottages, a few village churches and some examples of the town buildings which, as every visitor to France knows, often occur in the most unpromising alleys and byways of old French towns. France has always been the most intensely nationalistic of countries, and intensely national is her architecture also, full of poignant interest, quaintness of design, often gay of color and—in the country—always surrounded with hedges and flowers.

House at Arnay-le-Duc, Cote d'Or
Reduced illustration from "Small French Buildings"

Architects will find in this work much of interest which will aid them in present-day practice—the handling of roof surfaces, grouping of chimneys, arrangement of windows, particularly dormers, and the use of casements, while other valuable suggestions may be gathered concerning the use of stucco and half-timber, alone or in combination with other materials, the placing of gateways and the arrangement of buildings in groups, whether as farm buildings in quadrangle fashion or individual small houses facing village streets. The work is lavishly illustrated with half-tone cuts, and certain of the more important details are also presented in drawings, and it is well calculated to stimulate interest in a field of architecture which is rich but little known. The illustrations convey the spirit of these old buildings rather than their exact detail.

Architectural Rendering in Wash

By H. VAN BUREN MAGONIGLE, F.A.I.A.

A TREATISE on the rendering of architectural drawings, by an architect who has made a special study of this branch of draftsmanship, but written from the point of view of a beginner. The subjects of technique and materials are gone into minutely, and the work forms an invaluable manual for the student in this field. Fully illustrated by rendered drawings—one in color—by many of the best known draftsmen.

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LUTYENS HOUSES AND GARDENS. By Sir Lawrence Weaver. 203 pp., 5½ x 8¾ ins. Price $3.75. Country Life, Ltd., London.

THIS volume does not cover the entire scope of the work of Sir Edwin L. Lutyens, one of the most eminent of modern English architects, but is merely a record in condensed form of many of the examples of the work by which he is best known—the modern English suburban or country house. English architecture may well be regarded as supreme today if domestic work only be considered, and it is easy to see that in the work of Sir Edwin the English country house has been reconstituted and carried to its just conclusion. His houses and gardens are something more than a fashion, for in them fine design is combined with a skillful and discriminating use of materials. To his well defined style many American architects owe not a little.

House at Munstead Wood, England
Reduced illustration from "Lutyens Houses and Gardens"

Sir Edwin was one of the first of modern architects to realize that the building of a successful house presupposes a study of its site, environment and the kind of life it is intended to shelter, and his success is due in large measure to his good judgment in adapting his work to existing conditions. Since he has never been content to consider his duty done when a completed structure was turned over to its owners, but has supervised when he has not actually designed the furnishings and planned the development of the garden, his work stands in a place by itself as possessing a finished harmony. Like every architect, he realizes that skill comes with experience, and during the 35 years or more covered by this volume his work shows an ever stronger grasp upon the problem of the modern country home. The work is recommended to the attention and study of architects and decorators and to that constantly widening circle of the laity by whom domestic building and furnishing are held at their due value.

FURNITURE OF THE PILGRIM CENTURY. By Wallace Nutting. 587 pp., 7¾ x 10¾ ins. Price $15. Marshall Jones Company, Boston.

THE interest now felt by architects and decorators in early American building and furnishing would be greatly deepened and strengthened by study of the furniture and fittings of the period. This subject has never been gone into very carefully from the architect's point of view, partly because there are so many other styles which possess a more direct and ready appeal and partly because there have been but few authoritative

works upon the topic which were also sufficiently broad in scope to be of help.

This splendidly produced volume is one result of many years of careful study and collecting of early American furniture. It deals with furniture made in America, chiefly in New England, and during the "Pilgrim Century," which means the hundred years beginning with 1620 when the Pilgrims founded their settlement at Plymouth. It is interesting to note the loyal following in America of the changing fashions of furniture making in England. 1620 of course was during the reign of James I, while 1720 was well into the Georgian period, and all the types popular in England during this time were followed in the New England colonies. Of course it would be useless to expect in America the perfection which characterized English furniture of the period, produced by some of the most skillful craftsmen in all Europe, but the American pieces were of a standard surprisingly high and possessed a strength and rugged beauty which well expressed the Pilgrim character.

The interest of architects in this work will center chiefly about the intimate connection which exists between the actual structure and its furnishings. The pages show, besides actual furniture, many interiors of the period and numerous details of paneling and other interior trim, much of it of great interest, and a valuable part of the volume is that containing illustrations of the small belongings of architecture such as fireplace fittings of different kinds, hinges, knockers and latches, door scrapers, weather vanes and the scrolled bolts used for holding shutters in place, all details of interest to the architect who values correct precedent in the small but important items of design.

PICTURESQUE SPAIN. By Kurt Hielscher. 304 pp., 9½ x 12 ins. Bound in cloth. Price $4.50. Brentano's, New York.

THE varied character of the Spanish arts is due largely to the fact that Spain has been at different times subject to many influences. Celts, Iberians, Romans, Carthagenians, Moors and Goths have fought for supremacy in the peninsula and each race has left some definite imprint upon Spanish art. The present volume, which consists almost entirely of full page plates, is the photographic record of a sojourner in Spain who has a remarkable aptitude for selecting subjects of architectural value, and many of his pages will afford the architect an idea of the Spanish faculty of achieving effective, picturesque grouping or massing of buildings. Even when the author presents illustrations of such cities as Granada or Burgos, familiar from much illustrating, he selects details which are but little known, even to the usual traveler, and most of the views are of structures of different sorts in out of the way places which are full of suggestions for the architect working in styles which are Spanish or Italian.

In many instances there are given views of gardens or of patios—those open air spaces within houses in the picturesque treatment of which the Spanish excel, and along with many of the illustrations there are given details of decoration—exterior or interior—which the architect or decorator will often be able to turn to excellent account.

Smaller Italian Villas and Farm Houses

(Second Edition)

By GUY LOWELL

THE smaller buildings of Italy such as farm houses and minor villas offer a wealth of ideas to the present-day architect who is interested in residential design. The subject matter of this work was collected by the author during many sojourns in Italy, and being the work of a practicing architect is compiled and edited from an architect's point of view. With camera and sketch book Mr. Lowell has penetrated many of the regions of Italy seldom frequented by American or English tourists, and some of the buildings illustrated now live only in the form of illustrations, since they were destroyed during the war.

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HOUSE & GARDEN'S BOOK OF GARDENS. Edited by Richardson Wright. 127 pp., 9½ x 12¾ ins. Price $5. Condé Nast & Co., New York.

ARCHITECTS and decorators whose practice includes suburban or country residence work know that the garden and its arrangement often claim their attention, though a strict defining of the functions of architecture or decoration might place the garden and its design beyond their jurisdiction. Nevertheless, the correct solving of the garden's problems involves so much of the success of the house itself that generally they must be undertaken, and many suggestions for a wise solution may be gathered from this book.

Garden at Rye, New York
Mrs. Ellen Shipman, Landscape Architect
From *House & Garden's* "Book of Gardens"

Here are presented in illustration gardens large and small, in country and suburbs, and even some evolved from tiny spaces in the city. In some instances plans of the gardens are given, and to guarantee success the plans give detailed descriptions of just what is to be planted, where and when. There are also given many views of trellises, arbors, pergolas, garden and tea houses, various forms of decorative wooden screens and fences, tennis court stops. many garden gateways, lily pools, garden walls and the simpler forms of fountains. Considerable attention is also given to semi-outdoor spaces such as terraces, loggias and verandas, not forgetting what must be done to adapt some of these verandas and loggias for winter use by glazing them in and thus converting them into sun rooms or winter gardens.

Since the questions of greenhouses and hothouses are also apt to arise in this connection the volume, while by no means a technical treatise upon the subject, gives considerable helpful information, while 12 pages are devoted to "The Gardener's Calendar" which outlines the duties of each of the 365 days of the year. There are also given the names and addresses of the architects and landscape architects who have contributed to the subject matter of the book.

SOUNDPROOF PARTITIONS. By F. R. Watson, Professor of Experimental Physics, University of Illinois. Bulletin No. 127. Published by the Engineering Experiment Station of the University, at Urbana, Ill. Price 45 cents.

THIS brochure is an addition to the published data on various scientific subjects of practical importance which has already placed architects and builders under many obligations to the University. In this bulletin Prof. Watson deals with a topic which is sometimes of vital importance in that on the soundproof properties of its partitions the success of buildings of certain kinds absolutely depends.

The necessity of having quiet rooms in hospitals, laboratories of various kinds, office structures and hotels, and particularly in music studios and other similar buildings, and the necessity of solving other problems of the control of noise have led to many demands from architects for dependable information on methods for insulating sound, and here there are collected and presented in a concise and systematic manner the information now available, giving the results of countless experiments with different materials and describing installations of soundproofing, giving also some recommendations which may be applied when sound insulation is needed. The insulation of sound is a most complex problem, but enough is to be learned from the experience thus far gathered to give encouragement to the belief that soundproofing may before long be prescribed with much the assurance that now attends the acoustic designing of auditoriums.

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SPANISH INTERIORS AND FURNITURE. Part I. By Arthur Byne and Mildred Stapley. A portfolio of views of Spanish interiors and their details of furniture. 50 plates, 10¾ x 13¾ ins. Price $10.00. William Helburn, Inc., New York.

OLD Spanish domestic interiors possess a rugged, direct simplicity which is often of inspiration to architects and decorators. This portfolio presents illustrations of interiors of different periods from the sixteenth to the eighteenth century in which this quality is fully evident, as well as other views in which the native Spanish types show considerable influence from other parts of Europe. The plates include a number which illustrate the Spanish methods of handling roof timbers—of giving them structural forms which themselves possess a decorative character, and in ornamenting them with bold, simple carving which gives them an added value. Other plates which illustrate cupboards, cabinets or doors are valuable for giving designs which are not unduly difficult of execution but which are effective and decorative and well adapted to present-day use.

Old Tile Wainscot in Spanish Kitchen
Reduced illustration from "Spanish Interiors and Furniture"

Much of the interest of Spanish furniture and interior woodwork lies in the use of bands of simple chisel cutting, in bold geometrical patterns, and this volume includes two pages of full-sized working drawings, chiefly from the Madrid Museum of Industrial Arts, which any craftsman of reasonable proficiency could reproduce. The plates also suggest patterns which have been worked out in relief in plaster and used for interior friezes, patterns which in several instances show the use of geometrical Moorish detail.

Architects today, particularly those whose practice includes much country house work, are designing largely upon the model of the early Italian style and are sometimes following the early Spanish, which in many respects is closely allied to it. To such architects this work will be particularly helpful as well as interesting. The plan of the Spanish house is essentially simple and the charm of its virile simplicity is indicated in the illustrations of old interiors with which the volume abounds. Closely allied to the architecture of the Spanish type is the designing of furniture which the architects of the sixteenth, seventeenth and eighteenth centuries planned for their buildings, furniture of simple form and yet strong and decoratively effective and easy, for the most part, of being reproduced today.

Quite a number of the plates show the practical application to architecture of such arts as the working of metals and the manufacture of tiles; many are the windows or doors covered by the wrought iron grilles which are typical of Spain, and many views show the use of tiles in wainscots, seats, the risers of stairs or used for lining cupboards or the small recesses which the Spanish call "lavabos." The student of architecture or decoration will gather from this work a fair idea of the variety of resources which the Spanish types possess, and of the extent to which craftsmen in all the liberal arts may aid in the interpretation of the Spanish style with its wealth of architectural interest.

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(Second Edition)

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TOWN THEORY AND PRACTICE. By W. R. Lethaby, George L. Pepler, Sir Theodore G. Chambers, Raymond Unwin and R. L. Reiss. Edited by C. B. Purdom. 136 pp., 4½ x 7 ins. Benn Brothers, Ltd., London.

THE "garden city" idea has become so popular that almost any progressive suburban town in which the inhabitants pay reasonable attention to the appearance of their lawns and flower beds or the trees and grass areas along the roadways lays claim to the title; many enterprising promoters of suburban real estate exploit the term to their great financial benefit.

What is meant in England by a strict definition of the term "garden city" and what is outlined in this book, however, is something quite different, involving usually the founding of an entirely new settlement planned upon very definite lines with the ownership of all property vested in one body or at least subject to that body's definite control: "A 'garden city' is a town planned for industry and healthy living; of a size that makes possible a full measure of social life, but not larger; surrounded by a permanent belt of rural land; the whole of the land being in public ownership or held in trust for the community."

According to this volume there are but two settlements, even in England, which can rightfully claim to be garden cities—Letchworth and Welwyn—both near London. Plot plans of both are given and show well thought out planning of towns which have been developed upon lines formulated from the beginning, with certain areas devoted to residences, other districts to stores and public utilities, and certain districts given up to workshops and factories, necessary even in a garden city since its very scheme involves its being largely self-contained. The actual working out of the idea seems to belong within the domain of applied economics, but it can readily be seen that from the viewpoint of the town planner or the architect there exist great possibilities owing to the control being vested in one body, insuring growth upon a definite, pre-determined plan instead of being the result of haphazard development. The plot plans of the two garden cities mentioned show that due regard has been had for utilizing such natural advantages as exist.

SKETCHES OF EARLY AMERICAN ARCHITECTURE. A portfolio of sketches by O R. Eggers, with descriptive text by William H. Crocker, Editor of *The American Architect*. 56 plates, 19 pp. of text, 9 x 12 ins. Price $6. The American Architect, 243 West 39th Street, New York.

HERE are collected in portfolio form the sketches which for some time have formed the frontispieces of *The American Architect*—sketches of buildings which for the most part are fairly familiar or else destroyed, but given an added value here for being presented in the crisp architectural rendering for which Mr. Eggers is well known; a close study of his technique could scarcely fail to be of value to the designer or draftsman anxious to improve his own sketching ability. A number of the drawings included in the portfolio are of structures which have hitherto escaped wide attention, and several of them afford valuable suggestions to the designer. The plates are accompanied by a booklet giving a brief description of each of the buildings shown in the drawing, prepared by the editor of *The American Architect*, in which are considerable valuable data regarding the history of these old structures and details concerning the times of which they are relics.

THE ARCHITECTS' AND BUILDERS' HANDBOOK. By the late Frank E. Kidder. Compiled by a staff of specialists and Thomas Nolan, Editor in Chief. 1907 pp., 4 x 7 ins., flexible binding. Price $7 net. John Wiley & Sons, New York.

WITH the appearance of the 17th edition of this widely known work its name has been changed from "Pocket Book" to "Handbook"; other changes include a thorough revision, the rewriting of several chapters and the addition of others and the compiling of a new index, all details which add materially to the usefulness of the work as an authoritative handbook of engineering and building construction in their different departments. In many instances new articles have been added to the text and illustrations covering certain subjects, among this added matter being: New Data on Building Laws Relating to Loads on Masonry; Graphical Method of Determining the Center of Gravity of Plane Figures or Sections; Graphical Method of Determining Moments of Inertia of Plane Figures; Triangular Loading; End Connections of Tension Members; New Wire Data; New Matter on Gauges and Chains; Secondary Stresses; Angles Used as Beams; Data on Girderless Reinforced Concrete Floors; Data on Tanks, and on Stresses in Cylindrical Tanks. Of wide application are the sections in Part III which deal with Heating and Ventilating of Buildings; Pumps and Private Water Supply; Plumbing and Drainage; Lighting, and Acoustics, all subjects of vital importance to engineers, architects and builders everywhere, while at the end of the volume there is included considerable data relating to architectural practice, the registration of architects, standard forms of contract, etc.

The arrangement of tables, figures and problems and the compilation of much data which is necessarily highly technical gives every indication of having been done with the utmost care, and the printing and proofreading is characterized by the same attention to details which has attended the earlier editions of the work.

THE COUNTRY LIFE BOOK OF BUILDING AND DECORATING. Edited by Reginald T. Townsend. 100 pp., illustrated, 9¾ x 12¾ ins. Price $3. Doubleday, Page & Co., Garden City, N. Y.

Interesting Detail from House in New Jersey
Reduced illustration from "Country Life Book of Building and Decoration"

RATHER more than the scope indicated by the title to this book is covered by this compilation from the pages of late issues of *Country Life in America*, for in addition to the actual planning and building of a house and furnishing and decorating in their varied phases, considerable space is devoted to the interests of those who collect examples of early American art in the form of glass, silver, ceramics, metal work, textiles

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Actual furnishing is covered in specific chapters in which are discussed the arrangement of the hallway, living room, library, dining room, breakfast room, bedroom, nursery, kitchen and maid's room. The book covers a field broad enough to be widely interesting, but goes sufficiently into specific subjects to be helpful to many in solving individual problems.

MATERIALS OF CONSTRUCTION. By the late Prof. Adelbert P. Mills. Second edition, edited by Harrison W. Hayward. 476 pp., 5¾x9 ins. Price $4. John Wiley & Sons, Inc., New York.

THE best use of building materials is naturally dependent upon at least a working knowledge of their properties and qualities and these, in turn, are determined to a large extent by their ingredients and methods of manufacture. It follows, therefore, that when architects, engineers, contractors and members of the different building trades are familiar with this subject they are better able to employ such materials to advantage. This volume is a new edition of the well known work by the late Prof. Mills of Cornell University, which has proved of considerable value, and has been prepared and edited by Harrison W. Hayward, Professor of Materials of Engineering at the Massachusetts Institute of Technology, and the editor has had the co-operation of a number of members of the faculty of the same institution. While no fundamental changes have been made this later edition contains considerable new material.

Besides going into the processes of manufacture of different materials the volume goes with some minuteness into the properties of numerous materials such as gypsum plaster, quicklime, hydrated lime, cement, concrete, brick, terra cotta and like products, the ferrous and non-ferrous metals, timber, rope and various kinds of mechanical fabrics. The qualities of these materials, such as their strength, hardness and liability to shrinkage are discussed, and considerable attention is given to the effects upon them of temperature, alkali, etc. One particularly helpful section is that dealing with mechanical fabrics of various kinds, useful today since the development of modern aircraft and the automobile has brought into prominence many engineering materials the character and worth of which have never before been fully appreciated, and which are generally most familiar when used for hose, belting and similar purposes, their strength secured by the vulcanizing of the textiles themselves. The work is replete with diagrams, charts of different kinds, tables and drawings of various sorts which are calculated to promote the use of the materials discussed, and one especially helpful feature is the division of the work into sections with the pages which compose each section numbered independently of the rest of the book. An invaluable work for architects, engineers, builders of different classes, students and others to whom the possibilities afforded by these materials are important and who value the concise tabulation of such information.

HOUSE & GARDEN'S BOOK OF INTERIORS. Edited by Richardson Wright. 126 pp., 9½ x 12¾ ins. Price $4. Conde Nast & Co., New York.

THIS volume is one of a series of three, the others being "House & Garden's Book of Gardens" and "House & Garden's Book of Houses." As its title suggests, the book is a collection of views of the different rooms of various houses in city, suburb or country and affords the reader an idea of the wide scope of interior furnishing and decoration and of the excellent results which may follow their intelligent use. It would be difficult to imagine anything more charming than some of the rooms of which these pages afford many glimpses, the charm being due in part to the good taste which is evident in the selection of the furnishings themselves, in part to their arrangement, and in no small measure to the restraint which has been exercised to avoid overcrowding.

Comparatively few of the interiors illustrated could be termed strictly "period rooms." More beautiful, perhaps because they are often more suitable, are the interiors which are arranged in general adherence to a style but with the freedom which would be claimed by anyone of good taste at any period. Only a few of the interiors illustrated are beyond what might be termed the "moderate cost" limit, which gives the book an added value.

One of the most interesting details of the volume consists of the extent to which modern reproductions of fabrics, wall paper, furniture and accessories of all kinds have been used. It is not difficult to identify in these well arranged rooms countless objects which one could readily find in "open stock," and an idea of the desirability of these accessories and of how they will appear when actually in place is quickly grasped.

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SERVICE SECTION
of THE ARCHITECTURAL FORUM

Information on economic aspects of construction and direct service for architects on subjects allied to building, through members of THE FORUM Consultation Committee

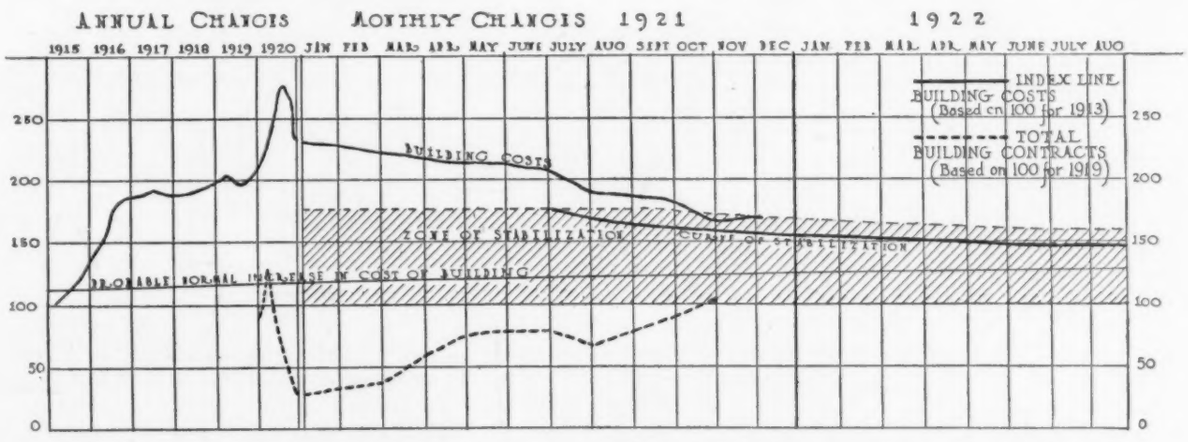
The Building Situation

IN this issue of THE ARCHITECTURAL FORUM two new service features are introduced. The first is the chart below, which will appear regularly on this page. The second is a digest of important information taken from various technical and general publications and bearing directly upon the business and financial phases of the construction industry. The chart presented below is explained in some detail in the accompanying caption. A study of this chart will show that in the late fall we entered into a period of building activity, partially as a result of increased confidence throughout the country, but particularly because of the rapid fall of the index line which shows the cost of building. For the purposes of this chart, the volume of building is represented by the money value of contracts let and shown by an index line using 1919 as the basis of 100.

This indicates clearly the state of growing public confidence in the building situation from the investment viewpoint and also the relation of the cost of building to the volume of new construction. Later we expect to have data available that will enable comparisons to be made between actual floor area of new building and its cost.

It is anticipated that the course of the index line showing amount of money invested will vary inversely with the approach of the cost index line to the curve of stabilization. When the cost index line crosses the curve of stabilization and penetrates deeper into the shaded area below, a large volume of building investment may be anticipated. The index lines on this chart are determined by reports issued by the Department of Commerce. The zone and curve of stabilization have been established by THE ARCHITECTURAL FORUM after a careful analysis of economic factors.

The building situation toward the end of December shows no radical changes since last reported. There is a slight tendency toward increased costs of some materials. The index of building material prices for November as issued by the Department of Labor shows an increase of 5 points. The cement and steel markets have fallen, due to the season. Production in lumber has been curtailed and orders as well as shipments show steady gains, making recent advances possible which have been sufficient to increase the general index figure for building materials. The ultimate disposition of wage rates for 1922 is awaited with considerable interest.



THIS chart is to be presented monthly with trend lines extended to the most recent date of available information. Its purpose is to show actual changes in the cost of building construction and the effect upon new building volume and investment as the *index line of building cost* approaches or recedes from the "curve of stabilization."

The CURVE OF STABILIZATION represents the building cost line at which investors in this field may be expected to build without fear of too great shrinkage in the reproduction value or income value of new buildings. The index line representing actual cost of building entered the ZONE OF STABILIZATION in the summer and fall of 1921. At that time the volume of new construction increased greatly. If this cost line passes *out* of the zone of stabilization, building volume will decrease materially.

The degree of the curve of stabilization is based on (a) an analysis of time involved in return to normal conditions after the civil war and that of 1812; (b) the effect of economic control exercised by the Federal Reserve Bank in accelerating this return after the recent war, and (c) an estimate of the probable normal increase in building cost.

Statistics of Building Volume and Cost

Reprinted from *Survey of Current Business*, issued by United States Department of Commerce

	NUMERICAL DATA					BASE YEAR OR PERIOD	PERCENTAGE INCREASE (+) OR DECREASE (−).						
	September, 1921	October, 1921	Corresponding month, 1920, September or October.	CUMULATIVE TOTAL THROUGH LATEST MONTH			Latest month from base.	Latest month from corresponding month, 1920	Cumulative 1921 from same period, 1920	July from June	August from July	September from August.	October from September.
				1921	1920								
BUILDING AND CONSTRUCTION.													
Building volume.....index numbers..	114	109	73	.....	.....	1913	+ 9 0	+ 49 3	.....	− 23.1	+ 4 4	+ 21.3	− 4.4
Building costs.....index numbers..	183	166	.....	.....	.....	1913	+ 66 0	.....	.....	− 5.4	− 2.6	− 2.7	− 9.3
Concrete factory costs.....index numbers..	157	154	1 265	.....	.....	1914	+ 54.0	− 41 9	.....	− 3.6	− 0.6	− 1 9	− 1 9
Contracts Awarded.													
Business buildings:													
Floor space.....thous. of sq. ft..	7,174	7,991	4,823	55,449	76,488	1919	− 14.0	+ 65 4	− 27 5	+ 8.2	+ 13.6	+ 4.0	+ 10.3
Value.....thous of dolls..	41,259	37,405	23,804	285,669	385.367	1919	+ 11 0	+ 58.6	− 25.5	− 30 7	+ 6.1	+ 17 3	− 9 0
Industrial buildings:													
Floor space.....thous of sq. ft..	2,706	3,984	5,392	28 730	118,655	1919	− 69 0	− 26.2	− 75 8	− 25.0	− 14.3	+ 16.7	+ 47.6
Value.....thous. of dolls..	11,283	18,419	26,932	141,077	534,234	1919	− 57 0	− 31 7	− 73 6	− 25 6	− 21 9	+ 1 0	+ 65.4
Residential buildings:													
Floor space.....thous. of sq. ft..	21,709	21,979	11,173	160,002	124,727	1919	+ 9 0	+ 96.2	+ 28.3	− 23.3	+ 29.0	+ 21.3	+ 0.9
Value.....thous. of dolls..	95,303	89,650	43,433	686,624	510,448	1919	+ 27 0	+108 2	+ 34 5	− 19 8	+ 34 1	+ 18.4	− 5.9
Educational buildings:													
Floor space. .....thous of sq ft..	4,238	3,228	1,779	33,870	24,514	1919	+ 69 0	+ 81 7	+ 38.2	+ 16.9	+ 2.2	− 5.2	− 23.5
Value. ....thous of dolls..	26,459	22,429	14,258	210,575	158,060	1919	+125 0	+ 57 3	+ 33 2	+ 22 1	− 2.1	− 5.3	− 15 4
Hospitals and institutions													
Floor space.....thous. of sq. ft..	1,987	680	742	9,403	5,559	1919	+ 85 0	− 8 0	+ 69 1	+ 4 9	− 44.4	+125.9	− 65.7
Value..... ....thous of dolls .	11,878	5,200	6,186	59,296	41,529	1919	+ 59 0	− 15 9	+ 42 8	− 35 5	− 41.3	+145.9	− 56.3
Public institutions:													
Floor space.....thous. of sq. ft..	501	212	315	2,569	2,620	1919	+ 23 0	− 32 8	− 1 9	+ 56 8	− 37.0	+234 5	− 57.7
Value... .....thous of dolls..	2,620	1,523	1,433	19.287	24,335	1919	+ 36 0	+ 6 3	− 20 7	+ 28.0	− 16.9	+ 75.9	− 41 9
Pub. works and pub. utilities, value, thous. of dolls	35.414	35.141	47,900	404,854	522,526	1919	− 16 0	− 27 0	− 22 5	− 11 1	− 4 5	− 20.6	− 1 2
Social and recreational buildings:													
Floor space..... .....thous. of sq ft.	1,990	1,383	661	15,252	11,011	1919	+ 9 0	+109 6	+ 38.5	− 11 0	+ 5.8	+ 22.7	− 30 6
Value.....thous. of dolls..	11,693	6,632	8,108	95,735	79,978	1919	− 5 0	− 18 1	+ 19 7	0 0	− 16.4	+ 37 7	− 43.5
Religious and memorial buildings:													
Floor space.....thous. of sq. ft..	1,222	928	584	8,201	4,300	1919	+109 0	+ 59 5	+ 90 7	+ 10.0	− 28.9	+ 34.8	− 24.0
Value.....thous of dolls..	7,778	5,735	5,041	53.784	36,443	1919	+ 83 0	+ 13 7	+ 47 6	+ 32.3	− 33.8	+ 25 8	− 26 5
Grand total:													
Floor space.....thous. of sq. ft..	41,702	40,436	25,469	313.975	367,074	1919	− 13.0	+ 58.2	− 14 7	− 11.7	+ 11.8	+ 18.4	− 3.3
Value.....thous. of dolls..	246,186	222,480	177,758	1,968.946	2,304,113	1919	+ 3 0	+ 24 1	− 14.5	− 6.6	+ 4 0	+ 11 7	− 10.4
Prices of Building Materials.													
Lumber:													
Southern pine, B and better * ....dolls. per M ft. b. m.	35.79	42.57	52.00	.....	.....	1913	+ 84.0	− 20.0	.....	− 0.7	+ 0.7	+ 9.9	+ 18.7
Douglas fir, No. 1, common *.....dolls. per M ft. b. m..	10.50	10.50	24.50	.....	.....	1913	+ 14.0	− 57.1	.....	0.0	− 8.8	0.0	0 0
Brick:													
Common red, New York *...dolls. per thous..	15.25	15.00	16.50	.....	.....	1913	+129.0	− 8.8	.....	+ 1.8	0.0	+ 3.1	− 1.3
Common salmon, Chicago *..dolls. per thous..	8.46	8.57	12.40	.....	.....	1913	+ 74.0	− 30.7	.....	+ 1.2	0.0	− 0 6	+ 1 8
Cement:													
Portland *.....dolls. per bbl..	1.59	1.50	1.95	.....	.....	1913	+ 55.0	− 22.9	.....	0.0	0.0	− 6.3	− 5.5
Structural steel:													
Steel beams * ....dolls per 100 lbs..	1.90	1.80	2.80	.. ..	....	1913	+ 16.0	− 37 0	....	− 4.8	− 11 5	0.0	− 5 7

SOMETHING of the building activity to be expected in 1922 may be gathered from a study of statistics in the fall months of 1921 as shown above from government data. The improvement in September and October over preceding months was particularly noticeable, and in direct evidence of the desire to build was the continuation of activity into October, when in normal years this month shows the beginning of seasonal inactivity.

The Chamber of Commerce of the United States has just completed a survey of building prospects for 1922, and its committee reports that the greatest activity will take place in the industrial states. This will comprise principally business buildings, a large part of which will be alterations and enlargements. Farm building is not expected to be very large, owing to the generally low prices offered for farm products and the fact that banks in agricultural sections are fully loaned up. Residential building is expected to count largely in the totals in all industrial sections and another large amount will be represented by educational buildings, both private and public. The many "drives" for funds undertaken during the past year will be responsible for many new college buildings in the coming year.

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A group of nationally known experts on various technical subjects allied to building, providing a direct service to architects

THE editors of THE ARCHITECTURAL FORUM have been fortunate in obtaining the co-operation of the following recognized experts who constitute THE FORUM Consultation Committee. This Committee provides a service of the greatest value to subscribers in addition to the usual editorial service, and architects who seek information on specific questions in these various fields are invited to present inquiries.

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(*a*) That each Committee member shall be a representative leader in his line;
(*b*) That no Committee member has affiliations with any manufacturer;
(*c*) That no Committee member will be called upon for detailed service except by special arrangement;
(*d*) That a special editorial article on a subject represented under each of the headings below shall be prepared during the year by the Committee member.

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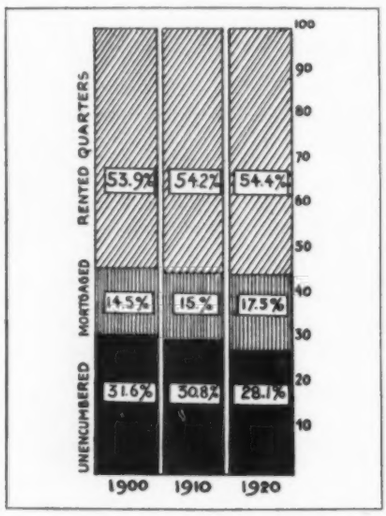
A SURVEY OF IMPORTANT CURRENT ARTICLES ON BUILDING ECONOMICS AND BUSINESS CONDITIONS AFFECTING CONSTRUCTION

The Editors of this Department select from a wide range of publications matter of definite interest to Architects which would otherwise be available only through laborious effort

PERCENTAGE OF OWNED HOMES DECREASING IN UNITED STATES

IN *The Annalist* of December 12, 1921, there is an interesting article by George H. Bruns showing the national housing trend for three decades. This chart shows the trend of home owning since 1900. This article claims that as the percentage of home owners declines, the percentage of owners whose property is mortgaged, increases. A wider adoption of the partial payment plan which ultimately satisfies the mortgage and leaves the property free and clear would remedy this situation. The advantages of a home-owning majority in a nation are so evident that the furtherance of this end would justify any practical means of accomplishment.



Housing Trend for Three Decades

STANDARDIZING CONSTRUCTION CONTRACTS

THE standardization of construction contracts, towards which far-sighted men in the industry have been looking for the last 20 years, seems about to be achieved at last through the efforts of a "conference" held in Washington recently.

This conference was composed of delegates appointed by eight national societies representing the engineers, architects and contractors of the United States, and the definite plan adopted was one which would ultimately produce a standard form of contract "agreement" which would be acceptable in all sections of the country and in all phases of this huge industry, which now ranks second only to agriculture in magnitude. Every constructor and owner who has wrestled with the intricacies of a contract, or worried over the apparently exact yet really doubtful meaning of its many complicated and legalized phrases, will approve this first attempt to frame in simple words an equitable and universal document.

SUGGESTED REMEDIES FOR DEPRESSION

IN *The Bulletin of the Associated General Contractors* for November, 1921, R. C. Marshall, Jr., General Manager of that organization, has written an extensive arti le under this heading. Some of the interesting points which he brings out are quoted here:

As to the present situation and the immediate problem of decreasing unemployment, we cannot look to agriculture, but there are several things we can look to that will tend towards a revival of business. Among those most evident are:

A. Arrangement by the government for financing the debt of the railroads, thereby putting them in a position to buy and thus start factories producing.

B. Stimulation of foreign trade.

C. Establishment of a Government Finance Corporation or Home Loan Bank to furnish money at a reasonable rate for housing and necessary private work. The government should also take action on all outstanding claims and determine them, whether appropriation for payment is available or not. Such determined claims are bankable.

D. Continued stimulation of construction work, particularly the letting of all public works, federal, state, county and city, for which appropriations are already made.

Should construction become active, what effect would it have on unemployment? For every man who is employed on a project there are four men in the country who work. A special bulletin of the Chamber of Commerce on Construction published in June of this year says that the produce of 25 per cent of the men employed in manufacturing goes to construction.

The census of 1919 shows that the products of 43 manufacturing industries go in whole or in part to construction. Thus it will be seen that the actual letting of a contract for construction sets in motion a great many of the wheels of industry. How then can construction work be started? Thirty days after the letting of a contract of approximately $100,000 we can confidently expect 20 men to be at work on the job. Not only has this happened, but between 50 and 60 men are set to work in factories in the basic manufacturing and other producing industries. Of these latter 50 or 60, the greater percentage work without regard to weather. If we can point to any means that will start $150,000,000 worth of construction work this fall, by simple arithmetic it will be seen that we can confidently expect the employment of 120,000 men by January 1.

Of industrial construction in many lines there is a surplus, yet an analysis of the situation shows that over the last decade construction is approximately $16,000,000,000 behind, made up thus:

Housing for 1,125,000 people	$5,000,000,000
Railroad construction	5,000,000,000
Public utilities	1,500,000,000
Hydro-electric development	1,500,000,000
Canals and waterways	500,000,000
Reclamation and irrigation	500,000,000
Highways	1,000,000,000
Business buildings	500,000,000
Docks, warehouses	500,000,000

It will be noted that there are left out of this tabulation several classes in which there will undoubtedly be some construction, but I cannot find authority for saying that they will assume sufficient proportions to include them.

With the housing necessities we are all more or less familiar. As to the railroads, it was stated by both Mr. Harriman and Mr. Hill since 1914 that $5,000,000,000 was needed for their proper expansion. This situation has been so repeatedly explained that it has become an accepted fact. Why the country should be so generally lacking in necessary facilities, it is difficult to ascertain. But this lack is creating a most pressing need and since this need exists it seems that we might as well turn to it as a proper source of expected activity, once it can be begun.

BUILDING SITUATION AS SHOWN BY FEDERAL RESERVE REPORTS

CLEVELAND DISTRICT. Building operations that showed such a reassuring recovery during the month of September are moving along with a fair amount of speed and present indications are that the activity will continue through the winter months.

There has been a better demand for building materials. The completion of many buildings of a residential character has had a noticeable effect on stocks, particularly of the lower grades. Inquiries are becoming more general and there is a greater tendency among dealers who have been buying from hand to mouth to replenish their stocks to something like normal conditions.

The reductions in wages and cost of materials made early in the summer have resulted in increased house building operations in Cleveland and vicinity.

NEW ENGLAND STATES. The total value of contracts awarded for new construction in New England during October, which amounted to $21,700,000, was the largest for any month in 1921 and was 21 per cent above that of October last year. In fact, the New England Federal Reserve District showed a larger gain between September and October than any other district in the United States.

MINNEAPOLIS DISTRICT. In nine cities of the Ninth Federal Reserve District the number of permits granted during October for building of all kinds receded only 2 per cent from the September figure and the valuation of permits actually increased 5 per cent between September and October. This change in the volume and value of building from September shows the same tendency that was exhibited last year, and was more satisfactory than the showing made in 1919 when both the number and valuation of permits fell off in October. As compared with October a year ago, the figures for October this year show a much larger volume of building.

CHICAGO DISTRICT. The building situation in Chicago, which, during the whole year, has been awaiting stabilized conditions in order that it might resume an activity that would satisfy the existing demand, is still in a state of confusion and of relative inactivity. While quite a large volume of building has been going on for this time of the year, it has not been proportionate to the demand that actually exists and the new work undertaken is mostly for smaller projects. The main development in the situation has been a bringing out of the attitude of the conflicting forces and of the issues at stake. A citizens' committee has been formed to uphold the principles formulated in the decision of Judge Landis, whether these are opposed by contractors or labor unions. The open shop is used to combat those unions that refuse to comply with the decision.

SAN FRANCISCO DISTRICT. Construction activity in this district during October passed all records both in the number and the value of building permits issued and continued the rapid increase in the volume of building operations which began last July. Building permits issued in 20 principal cities of this district during October, 1921, numbered 11,442 with an estimated valuation of $23,333,741, exceeding the previous record month of September, 1921, by 373, or 3.3 per cent in number, and by $3,198,748, or 15.8 per cent in value. Compared with October, 1920, the figures for October, 1921, represent an increase of 2,982, or 35.2 per cent in number and of $8,965,832, or 62.4 per cent in value. Again, comparing October, 1921, with the same month last year, increases occurred in all reporting cities with the exception of Boise, Ogden, Phoenix, San Jose, Seattle and Stockton. The greatest increase was reported from Sacramento (261.8 per cent) and the greatest decrease from Phoenix (71.4 per cent).

KANSAS CITY DISTRICT. October building permits in 20 cities of this district numbered 2,992 and the estimated cost of these buildings was placed at $8,472,038. This gives October the high record for the year in the estimated cost of buildings for which permits were issued. This is a 74.3 per cent gain in activity over the corresponding month last year. The high activity of building, coming at the end of the year, is very gratifying as it gives encouragement for a larger spring activity. Several of the cities report a large amount of building in prospect for early next year, the building of new homes claiming the larger share. A summary of the reports of building permits issued during October in these cities follows:

	Permits	Est. Value	Per c't Change
Kansas City, Mo.....	546	$2,711,600	166.6
Wichita, Kans	358	1,176,542	343.9
Denver, Colo.....	587	1,033,700	182.2
Oklahoma City, Okla .	298	879,837	91.0
Tulsa, Okla.....	178	723,15)	8.8
Omaha, Nebr.....	193	572,640	—9.2
St. Joseph, Mo.....	105	192,903	212.6
Topeka, Kans.....	121	173,840	44.8
Lincoln, Nebr.....	70	122,880	—23.1
Kansas City, Kans ...	76	114,825	199.7
Muskogee, Okla.....	36	111,069	—3.3
Pueblo, Colo.....	101	102,472	—6.8
Enid, Okla.....	41	100,500	3.1
Okmulgee, Okla.....	34	97,750	—21.6
Hutchinson, Kans.....	36	93,125	.....
Casper, Wyo.....	83	92,060	—79.9
Colorado Springs, Colo.	81	53,319	—49.4
Cheyenne, Wyo.....	22	49,880	56.1
Leavenworth, Kans...	15	35,700	70.0
Joplin, Mo.....	11	34,246	183.2
Total, October, 1921..	2,992	$8,472,038	* 74.3
Total, October, 1920..	1,648	4,859,938	

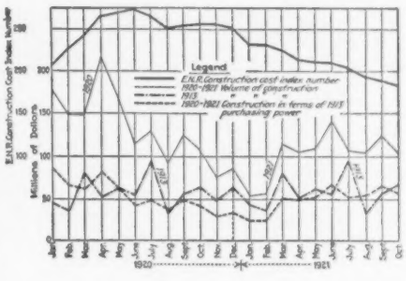
*Percentage computed on cities reporting for October of both years.

1922 A BETTER CONSTRUCTION YEAR

IN the December, 1921, issue, THE ARCHITECTURAL FORUM presented the result of a survey of future building activity as carried out through architects' offices. This, with a presentation of facts regarding entry into the zone of stabilization in building costs, developed the prediction that 1922 would be a year of considerable activity and would mark the definite upturn in the construction field. It is interesting to note that the *Engineering News-Record* (November 24, 1921), in an article under the heading "Construction Industry Has Been Waiting for Steady Prices," arrives at the same conclusion from different lines of argument. Here is the information on this subject as presented in this article:

It is agreed that except for industrial works the country is underbuilt. It is generally believed that 1921 is an off year for construction. A definite reason for this paradox is the price situation.

Prices have fallen steadily since the peak in the summer of 1920. The *Engineering News-Record* Construction Cost Index Number shows this decline —fairly evenly downward in 1921. The chart giving the cost index number also carries the monthly volume of contracts let on all classes of engineering construction in 1920, 1921 and 1913.



Comparison of the actual volume of contracts let in 1920 and 1921 with 1913 —as differing from a mere comparison of amounts of money—may be made by using the cost index number. By this means the actual volume of construction in 1920, computed from the total of contracts let, was 9 per cent less than the 1913 volume. Construction, or contracts let, in 1921 to Nov. 1 is 15 per cent less than in the ten months of 1913. This means that the amount of construction this year is 85 per cent of the amount in 1913.

Uncertainty as to future prices has been a major factor in this falling off of construction. Construction cost has declined 39 per cent since the peak in June, 1920, and is now about 66 per cent above the 1913 level. These figures include also the cost of labor. For the entire country common labor has fallen from 64 cents per hour to an average of

45 cents. In certain sections rate-cutting has been radical, while elsewhere, as in New York, peak rates are still in force. Common labor can be hired in the South for as low as 15 to 20 cents per hour. The 1913 average for the country may be taken as 22 cents per hour. It is therefore probable that labor cost will continue to decline in 1922, and this will work to draw certain materials below present levels.

If prices thus continue their decline there will remain a measurable uncertainty in the construction industry. It must be borne in mind, however, that any future decline in prices will not be from a peak, but from levels that are already satisfactory in many instances. Therefore, there should not be anything like the uncertainty that has prevailed since the summer of 1920 to date. Furthermore, the volume of construction of an urgent nature is steadily swelling and a certain proportion of this must be released, irrespective of market conditions. It seems safe to predict that 1922 will be a considerably better construction year than the present, and that the years following will show the construction industry really catching up.

CO-OPERATIVE OWNERSHIP AS PRACTICED IN CHICAGO

THE *American Contractor* for November 12, 1921 reports that a recent act of the Illinois state legislature has made it possible for Chicago to put into operation a plan of co-operation in the ownership of apartment buildings that heretofore has been available only to cities in other states. This participation of the tenant in the ownership and operation of the building has for some time been an acceptable solution of the high rent problem in New York and other eastern cities.

Up to the present time in Chicago only buildings have been purchased which are already in existence. But the future holds plans for co-operative building and, with the lessened expense necessarily involved by each prospective tenant, a tremendous opportunity exists for more extensive building during the next few years. As the idea spreads and experiments prove the wisdom of the plan as well as show the needs peculiar to such a tenantry, buildings will, doubtless, be designed for this purpose and with the idea of co-operative ownership in view.

Under the plan now being used by Albert W. Swayne & Company, in Chicago, the tenant becomes owner of his apartment with the purchase of a certain number of shares of stock, the number being determined by the size of his apartment and its relation to the rest of the building.

The first of the buildings to be organized by the company was a 24-apartment building at 1458-64 Argyle street. The stock was issued by the building corporation and, as soon as it had been bought up by 24 tenants, the property became theirs. The tenants are incorporated under the laws of the State of Illinois as the Argyle Apartment Building Company. Yearly assessments, payable monthly, are made. These cover the cost of janitor service, taxes, coal, water, light, removal of garbage and ashes, interest on mortgage loan, prepayment on mortgage and miscellaneous expenses. The monthly assessment for the first year amounts to a little more than half the previous rental price of the apartment and the assessment decreases each year as the mortgage is reduced. By the time the mortgage is wholly paid off the rental for a five-room apartment will amount (at present rate of up-keep expense) to approximately $20 a month. The total of stock and assessments for five years is, in all cases, from $200 to $400 less than the sum total of rentals payable under the old system of private ownership, and the apartment belongs to the man who is paying for it.

The management of the building is in the hands of a board of directors selected by the tenant-corporation. One director is selected from each entrance of the building and one at large. Local troubles, such as lack of heat and needed repairs, are reported to the entrance director and in turn to the manager of the building who is selected annually by the directors from among the stockholders. No salary is given the directors. Decorating is done by the tenant-owner at his own expense, exactly as it would be done in his own house. The owner may sell at any time his share of the stock in the corporation, but only with the approval of the board of directors, who must put the new buyer to a test of references, reliability and desirability.

IS UNION CONTROL OF BUILDING DOOMED IN CHICAGO?

UNION control of building in Chicago is doomed, in the opinion of those who are in a position to know, if the citizens' committee stands by its decision to make contractors and unionists alike carry out the provisions of the award made by Judge Landis several months ago regarding wage schedules and working conditions in the building trades. This fact was brought out in a meeting December 1 in Chicago of about 25 secretaries and executive officers of construction interests and material associations, constituent members of the National Federation of Construction Industries by John J. O'Leary of the Citizens' Committee for the Enforcement of the Landis Award. Mr. O'Leary outlined the work accomplished in which he indicated that both unionists and contractors who are refusing to abide by the Landis rules of working conditions as well as wage scales were finding things difficult.

As an indication of what has been accomplished so far by the citizens' committee nearly 1500 carpenters are working in accordance with the award and in defiance of their union. They are protected by 175 guards furnished by the committee. Surveys of jobs are being made and 83 per cent of the work in Chicago is now reported operating under the Landis agreement. An apartment house builder who had all but closed a $1,000,000 bank loan was refused the money on his declaration that he proposed to ignore the Landis award. After three days' reflection he changed his mind. The majority of financial houses are behind the award. Work on the new Federal Reserve Bank building, which is one of the largest unfinished pieces of construction in the downtown district, is to be carried forward in accordance with the Landis provisions.

The committee has incorporated and proposes to stay in operation several years if necessary. A fund of $3,000,000 is being raised, to be paid in 10 per cent installments.—*Engineering News-Record*, Dec. 8, 1921.

STANDARDIZING FURNITURE TRADE TERMS

IN *Good Furniture* for December, 1921, there is presented an outline of standards recommended at recent conferences of furniture manufacturers. Architects and their clients will be interested in these suggested trade terms when the purchase of furniture is under consideration. They are:

(AA) SOLID THROUGHOUT. The term "Solid Throughout" shall apply to all furniture which is made entirely of the wood designated.

(A) SOLID EXTERIOR. The term "Solid Exterior" shall be applied to all furniture of which all the exposed parts are made of the wood designated, except case back, case bottom and mirror back in case goods, and similar exceptions in other lines to be agreed upon as they arise. The interior of the case goods or piece may be constructed of such woods as the manufacturer may consider suitable for the purpose.

(B) BUILT-UP. Furniture designated as "Built-up" shall have all exteriors made of the kind of wood designated, excepting case back, case bottom and mirror back and similar exceptions in other lines as they arise. The tops, fronts and ends may be of built-up stock.

The interior of the case goods or piece may be constructed of such woods as the manufacturer may consider suitable for the purpose. The term, "Built-up" shall be used to replace the term "veneered" heretofore used.

(C) COMBINATION. Furniture designated as "Combination" shall have the tops, drawer fronts or doors and ends of built-up stock or solid wood of the kind designated. The remainder of the case or piece to be constructed of such woods as the manufacturer may consider most suitable for the purpose. The kinds of woods used should be named in the description of the suite or piece, such as "Mahogany and Birchwood," "Walnut and Gumwood," etc.

(D) FINISH. The term "Finish" shall be used only in connection with the name of the wood of which the furniture is made, such as "Gumwood, Walnut Finish"; "Birchwood, Mahogany Finish."

Such terms as "Gum-Mahogany," "Birch-Mahogany" shall not be used.

(E) MISLEADING NAMES. All furniture shall be called by the names of the woods of which it is made and which do not mislead, and not by substitute, fanciful or trade names.

(F) IMITATIONS. Imitations of woods or grains shall be called imitations in all descriptions of such kinds of furniture.

Suggestions and criticisms should be sent to National Vigilance Committee, 110 West 40th street, New York.

TREND OF MATERIAL PRICES

IN the closing issue of the year, December 31, 1921, the *American Contractor* presents a careful survey of the price movement of building materials over the past several years and in particular detail over the months of 1920 and 1921. This record of price movements is based on actual quotations for materials appearing in issues of the *American Contractor* for the period and it, therefore, presents a true picture of conditions, not influenced by theory.

A variation from previous records of this nature is the adoption of a post-war base for comparison. This base is the average price of any given material for the first 10 months of 1921, and the reasons for its adoption follow.

The main requirement for a reasonable base is that the relationship of the different materials in price be as nearly perfect as possible. This is not an easy requirement, because at any time it is natural that the prices of some materials should be temporarily out of line with others. During the first 10 months of 1921, however, there have been carried out what are most likely the final steps in a period of deflation. A test of the fairness of this period as forming a base may be had in the case of lumber. At the beginning of the year lumber had shrunk considerably in value, and during the following months it had to struggle to get a market, and although it was still quite high, the fact that it went below most of the other materials and contended with a buyer's market seems justification enough for taking this period as an index of a three years' period of activity. In general the same considerations affect the markets for the other materials, and this seems to make the 10-month period of 1921 a logical base.

The materials that were selected for record are:

1. Common brick, the price being the composite of 14 cities per 1000, delivered on the job.
2. Portland cement, the price being the composite of 14 cities per barrel (package not included), in carload lots to contractors.
3. Sand, gravel and crushed stone, the price being the composite of 14 cities for the three commodities, f.o.b. cars in carload lots at shipping point.
4. Structural steel, composite price of beams, channels, angles and tees taken as price of "shapes," and prices of plates and bars per 100 pounds, f.o.b. Pittsburgh.
5. Lumber, the price being the composite of five items of Southern pine and four items of Douglas fir, f.o.b. mill.

The prices for these several commodities have been worked out on a percentage basis, using the period of the first 10 months of 1921 as a base, and the movement is recorded in the chart on this page.

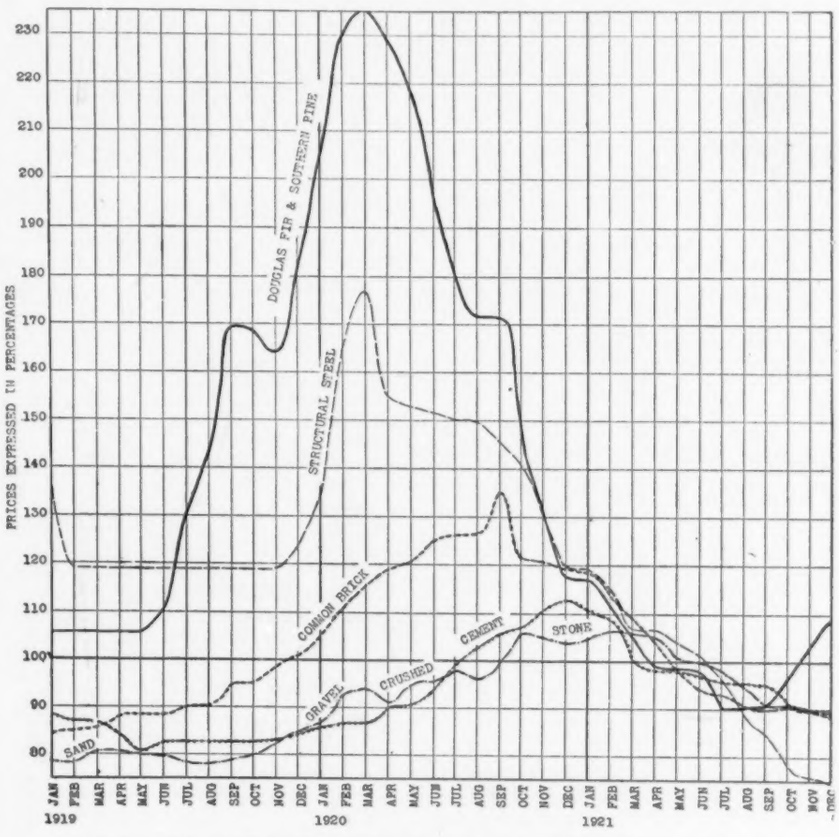
A special note is made of the fact that this comparison is simply a record of the actual movement of prices and does not in any sense attempt to consider fairness of price. This is a separate issue, involving an extensive consideration of economics of which this study takes no cognizance.

This chart shows the average national trend of prices and does not record the movement in separate localities, except as these are considered in arriving at an average. There is a marked variation in prices in different localities of the United States. This is possibly best illustrated in the case of common brick. Chicago brick, for instance, is far under the average in price, and there is a reason for this. The character of the clay of this district is such that a single brick machine can turn out 300,000 bricks a day, whereas in districts with clay of normal plasticity, a machine does well to turn out 70,000 a day; added to this, Chicago clay does not require as high a degree of temperature in the kilns.

Future Price Trends. While various economic considerations, such as circulating credit of the country, the status of world conditions and their effect upon this country will influence prices, the specific condition will be the demand for building in 1922. On the one hand this will be determined by what the potential builder thinks of the market, and on the other hand by the reaction of the material interests as they scan the amount of work contemplated or under way.

This chasing in circles is alleviated somewhat by competition, and this does exist to a great extent in the field of building materials and is particularly noticeable between such basic materials as lumber, brick, hollow tile and cement.

The article sums up, after the consideration of all these factors and in view of the suprising holdup in valuation of contract awards in the latter part of 1921, with expressing a conviction that demand for materials will be better this year than in 1921, and that the average price tendency for the year will be very moderately upward from price level at close of 1921.



Index of Material Price Changes from January 1, 1919 to December 31, 1921
Average price of first 10 months of 1921 used for base

BUILDING INDUSTRY CODE OF ETHICS

THE New York Building Congress, at a meeting at the Engineers' Club recently, ratified a Code of Ethics for the building industry which, while not mandatory in any respect, points the way to curing many of the existing evils and practices now adversely affecting the progress of the industry.

This code was prepared after many hours of intense study and research on the part of the Committee on Codes of the New York Building Congress. William J. Barney was the Chairman of this committee and his assistants were: F. A. Burdett, engineer; Charles Ewing, architect; Burt L. Fenner, architect; R. D. Kaufman, banker; F. W. Lord, sub-contractor; W. G. Luce, contractor; Roswell D. Tompkins, labor representative, and Richard A. Wolff, sub-contractor.

Although not binding in legal manner and only of such value to the industry as individuals may voluntarily make it, the members of the congress feel that the document is by far the most important attempt of this organization and one that will be of lasting benefit to all construction interests.

The Code of Ethics for the Building Industry is constructive in every article and section. It clearly points out the moral obligations of each element in the industry to his co-worker and, although in the past there have been various codes that applied specifically to single trades or professions, the code now adopted by the congress is the first ever formulated that takes in all of the elements concerned and applies a program of ethical procedure to them.

A synopsis of the code follows:

It is unethical for anyone engaged in the building industry or any of its branches:

General—Article 1

Section 1—To unduly or improperly increase the cost of work or to produce work or workmanship inferior to that contracted for.
Section 2—To falsely or maliciously injure the reputation or business of another.
Section 3—To offer or accept commissions intended to influence sales or contracts.
Section 4—To endeavor to circumvent the fair and reasonable enforcement of ordinances and safety and sanitary codes.
Section 5—To resort to or countenance "Shopping."

The Owner—Article 2

Section 1—To call for unnecessary or full estimates on tentative projects, or from unacceptable bidders, or to withhold proper facilities from those estimating.
Section 2—To refuse credit data and statement as to reality of the project.
Section 3—To deal directly with the contractor where an engineer or architect has been employed for full services, including supervision.
Section 4—To endeavor to improperly influence the architect's or engineer's decisions as to contract obligations.

The Banker—Article 3

Section 1—To fail to give due weight to the community value of improvements for which loans are desired.
Section 2—To fail to acquaint the borrower with all conditions (especially as to approval of materials and construction) under which the loan is made.
Section 3—To overload building costs with fees, commissions or bonuses not legitimately earned.

The Real Estate Broker—Article 4

Section 1—To misrepresent conditions or conceal any facts having an important bearing upon the real value of a property.
Section 2—To advise a type of development opposed to the community interest.

The Architect and Engineer—Article 5

Section 1—To act in any other than a judicial capacity in determining contract obligations; or to fail to require full performance equally by owner and contractor.
Section 2—To require a contractor to perform for him any part of the service which is generally recognized as the architect's work.
Section 3—To cover possible oversights or errors by indefinite clauses in contract or specifications.
Section 4—To withhold certificates for payment when properly due under a contract.
Section 5—To engage in the building trades.

The Contractor—Article 6

Section 1—To give, knowingly, work or workmanship inferior to that contracted for.
Section 2—To endeavor to supplant the architect or engineer with the owner.
Section 3—To submit to the owner directly, without the architect's approval and knowledge, any proposals or estimates.
Section 4—To fail to recognize his moral obligations to sub-contractors whose bids he has used in making his own proposal.
Section 5—To knowingly or carelessly underestimate the value or time of completion of any work.
Section 6—To withhold payment to sub-contractors and dealers for work or for materials for which he has received payment.

Sub-Contractors and Material Dealers—Article 7

Section 1—Knowingly to mislead through trade customs or terms as to the real cost or quality of work or materials, and to mislead as to time of completion of work or delivery of materials.

Labor—Article 8

Section 1—To restrict the quantity or quality of the output of the individual.
Section 2—To increase cost through arbitrary rules as to number of workmen employed or use of plant and equipment.
Section 3—To deny to any man the opportunity to learn and, when qualified, to practice a trade.
Section 4—To abandon the work pending the decision of disputes between trades.

LABOR RATES IN THE BUILDING TRADES

THERE is given here a tabulation of rates of wages of bricklayers, carpenters, structural iron workers and common laborers as shown in the *Engineering News-Record* of December 1, 1921.

Cities	Bricklayers	Carpenters	Structural iron workers	Common laborers
Atlanta	$0.90	$0.70	$1.00	$0.20
Baltimore	1.25	.80	1.00	.30
Birmingham	1.00	.75	1.00	.15@.25
Boston	.90	.75	.90	.40
Cincinnati	1.12½	.87½	.77½	.37½
Chicago	1.10	1.00	1.05	.35@.40
Cleveland	1.04	1.04	1.04	.57½
Dallas	1.00	1.00	1.00	.35@.45
Denver	1.37½	1.00	1.00	.35@.40
Detroit	1.00	.80	.60@.80	.50
Kansas City	1.07½	1.00	1.07½	.70
Los Angeles	1.25	1.00	1.00	.50
Minneapolis	1.00	.80	.80	.50
Montreal	.80	.60	.55	.25@.30
New Orleans	1.00	.88	1.00	.30
New York	1.25	1.12½	1.12½	.75
Pittsburgh	1.12½	1.00	1.00	Open
St. Louis	1.25	1.25	1.25	.62½
San Francisco	1.16	1.03	1.16	—.45@.55
Seattle	1.00	.80	.80@.90	.50
Philadelphia	1.00	.90	.90	.50@.60

SERVICE SECTION
of THE ARCHITECTURAL FORUM

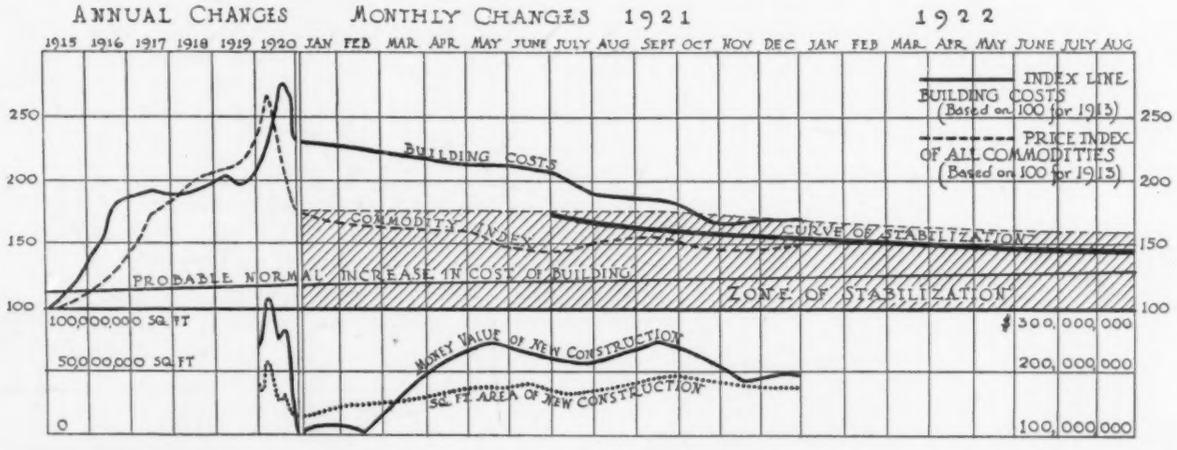
Information on economic aspects of construction and direct service for architects on subjects allied to building, through members of THE FORUM Consultation Committee

The Building Situation

AS we enter the first period of the year 1922 the building situation may be said to have developed exactly in accordance with the various forecasts presented by THE ARCHITECTURAL FORUM during the summer of 1921. An examination of the chart shown herewith indicates that there has been a definite increase in the volume of building construction almost in proportion with the decrease of building costs. It will be seen also that the building cost index line has followed the natural trend of deflation as anticipated by the drop in the commodity price index. The closing months of 1921 showed a strong resumption of activity in the building field; the month of December, according to figures compiled by the F. W. Dodge Company, shows a total of contracts awarded 3% greater than in November and 98% greater than the figure for December, 1920. The index line of building cost has turned upward slightly since November and December, owing to a reaction in the price of certain basic materials such as lumber and brick. One of the articles in the following digest contains information presented by Monks & Johnson of Boston indicating that the actual cost index line should be lower than it is shown in this chart, due to the effect of competition among contractors and sub-contractors, which is an element not considered in developing the cost index line. This competition, together with an increased efficiency of labor, has the tendency to indicate actual building costs as somewhat lower than shown by a trend line based only on building material cost and labor changes.

It seems to be the consensus of opinion in contractors' offices and in the offices of large financial institutions that the demand developing early this year will have a tendency to bring about an increase in building material prices. This increase will not be large, however, and will probably be entirely offset by increased production of labor in the building trades, together with other factors which affect the situation.

Without question there is much in the present situation which offers encouragement to architects. The year 1921 has seen the period of least activity which may be expected for a number of years. The corner has been definitely turned and many architects already are feeling the effect of the increased confidence of the building public.


ANNUAL CHANGES
MONTHLY CHANGES 1921
1922
1915 1916 1917 1918 1919 1920 JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC JAN FEB MAR APR MAY JUNE JULY AUG
INDEX LINE BUILDING COSTS (Based on 100 for 1913)
PRICE INDEX OF ALL COMMODITIES (Based on 100 for 1913)
250
200
150
100
BUILDING COSTS
COMMODITY INDEX
CURVE OF STABILIZATION
PROBABLE NORMAL INCREASE IN COST OF BUILDING
ZONE OF STABILIZATION
100,000,000 SQ FT
50,000,000 SQ FT
0
MONEY VALUE OF NEW CONSTRUCTION
SQ FT AREA OF NEW CONSTRUCTION
$300,000,000
200,000,000
100,000,000

THIS chart is to be presented monthly with trend lines extended to the most recent date of available information. Its purpose is to show actual changes in the cost of building construction and the effect upon new building volume and investment as the *index line of building cost* approaches or recedes from the "curve of stabilization."

The CURVE OF STABILIZATION represents the building cost line at which investors in this field may be expected to build without fear of too great shrinkage in the reproduction value or income value of new buildings. The index line representing actual cost of building entered the ZONE OF STABILIZATION in the summer and fall of 1921. At that time the volume of new construction increased greatly. If this cost line passes *out* of the zone of stabilization, building volume will decrease materially.

The degree of the curve of stabilization is based on (a) an analysis of time involved in return to normal conditions after the civil war and that of 1812; (b) the effect of economic control exercised by the Federal Reserve Bank in accelerating this return after the recent war, and (c) an estimate of the probable normal increase in building cost.

Trend of Costs in Industrial Buildings

SINCE April, 1920, an interesting series of monthly bulletins has been presented by the S. C. Sperry Co., Inc., engineers and contractors of Boston. The purpose of these bulletins has been to demonstrate the monthly changes in the cost of a specific factory building, a perspective, typical floor plan, and cross section of which are shown here.

Outline specifications for this building are thus given:

Concrete Work: Conforming to all standards of the Boston Building Code, and best standard engineering practice. Exterior surfaces carborundum rubbed.

Mason Work: Curtain walls, selected common brick. Interior partitions, 6-in. hollow tile.

Roofing: 3-ply tar and gravel roofing, 10-year guarantee. Mastic flashing full height of parapets.

Plumbing: Ample toilet facilities on each floor, based on size of building. Good fixtures.

Sash and Glass: Steel sash, clear double-thick glass in two lower rows, factory-ribbed glass above.

Painting: Manufacturer's priming coat, and two coats at job on sash, doors and metal work. Two coats mill white on walls and ceilings.

Heating: Radiation to heat building to 70° in zero weather. Boiler room, boiler and chimney not included in this design.

Electric Work: Complete lighting installation according to best fireproof standards. No special lighting or power included.

Elevators: In view of the various purposes for which this building may be used, the installation of freight and passenger elevators has not been included.

The building design presented calls for concrete construction of the flat slab type which finds considerable favor in the industrial field. Dimensions of story heights and placing of columns have been selected to combine economy and maximum utility and to represent a fair average. Floor loading of 150 lbs. per square foot, which represents a fair industrial average, has been chosen. The walls are of the brick curtain type with steel sash.

In the tabulation which appears on this page will be found the price quotations on this building as issued on a lump sum basis, together with graphic presentation showing the trend of costs in this class of construction.

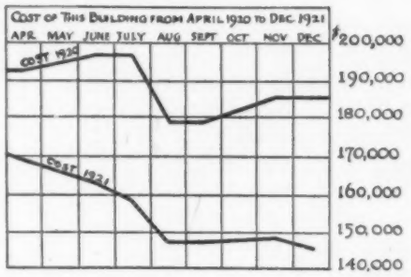
These prices are the result of actual estimates on the same building and in the same locality (Boston), and they, therefore, represent as accurate an idea of the price trend as it is possible to get, although they apply with most force to the Boston territory; the relative changes should, however, correspond in direction with those in other parts of the country except where unusual local conditions exert a temporary effect.

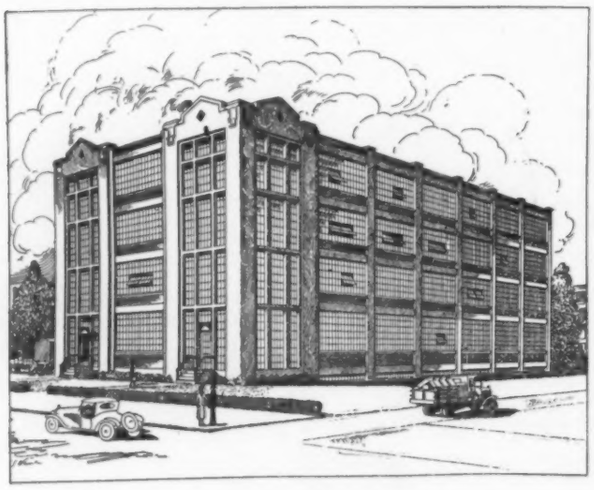
It is interesting to compare the trend of cost of industrial construction for 1921 in this chart with the cost of building index line in the chart on the preceding page and also with the market quotation cost of completed buildings in the chart prepared by Monks & Johnson illustrated on page 59. The line of costs in the industrial building chart continues to fall through December, whereas the index lines on the other charts show an upturn. The first line represents actual contract figures which reflect the present element of competition, while the others indicate the asking price, and the divergence between them indicates the benefit that buildings put under contract now are receiving.

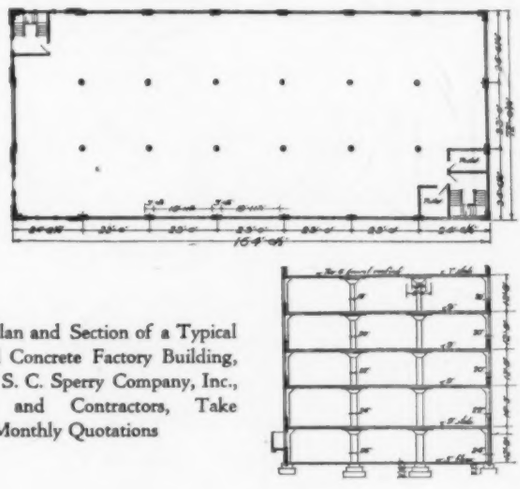
TREND OF COSTS ON TYPICAL FACTORY BUILDING

ACTUAL CONTRACT COST FIGURES

	1920	1921	1921 Sq. ft. cost
April	$193,200	$169,500	$2.87
June	197,200	163,490	2.77
July	197,200	159,220	2.70
Aug.	179,200	147,900	2.50
Sept.	179,200	147,900	2.50
Nov.	185,875	148,350	2.51
Dec.	185,875	145,900	2.47







Exterior, Plan and Section of a Typical Reinforced Concrete Factory Building, on Which S. C. Sperry Company, Inc., Engineers and Contractors, Take Monthly Quotations

THE FORUM CONSULTATION COMMITTEE

A group of nationally known experts on various technical subjects allied to building, providing a direct service to architects

THE editors of THE ARCHITECTURAL FORUM have been fortunate in obtaining the co-operation of the following recognized experts who constitute THE FORUM Consultation Committee. This Committee provides a service of the greatest value to subscribers in addition to the usual editorial service, and architects who seek information on specific questions in these various fields are invited to present inquiries.

The basis on which this Committee has been organized is:

(*a*) That each Committee member shall be a representative leader in his line;
(*b*) That no Committee member has affiliations with any manufacturer;
(*c*) That no Committee member will be called upon for detailed service except by special arrangement;
(*d*) That a special editorial article on a subject represented under each of the headings below shall be prepared during the year by the Committee member.

SUBJECTS AND COMMITTEE PERSONNEL

FINANCE

WALTER STABLER
Comptroller, Metropolitan Life Insurance Co.

The largest institution in the United States making loans for building construction. Mr. Stabler's knowledge of building investments covers the country and is widely recognized.

CO-OPERATIVE FINANCING

FREDERIC CULVER
President, Culver & Co., New York

A specialist in the financing and development of co-operative house projects. Mr. Culver has successfully developed approximately 25 million dollars' worth of co-operative apartment houses. He is an attorney and has had long experience in financing and construction of this nature.

REAL ESTATE

C. STANLEY TAYLOR

Widely experienced in real estate development and financing, real property law, architecture, engineering and building construction. Financial and Business Editor of THE ARCHITECTURAL FORUM.

FIRE PROTECTION ENGINEERING

J. D. HUNTER
Chief Engineer, Marsh & McLennan, Insurance Brokers, New York

Specialist in insurance engineering as applied to building design, construction and equipment.

HOTEL DESIGN AND EQUIPMENT

DANIEL P. RITCHEY

Known in the hotel field as the "hotel doctor." Mr. Ritchey, who is an engineer as well as an experienced hotel owner and manager, is qualified to answer any questions which may arise in this connection.

BUILDING MANAGEMENT

J. CLYDESDALE CUSHMAN
President, Cushman & Wakefield, Inc., Real Estate, New York, Former Secretary, Building Managers and Owners' Association of New York

Mr. Cushman's firm has participated largely in the promotion and operation of many large New York buildings. His specialty is the management of office buildings.

ELECTRICAL SCIENCE

WILLIAM L. GOODWIN
Assistant to the President and in charge of activities of the Society for Electrical Development

This Society is organized to promote accurate knowledge of the practical application of electricity. Its activities extend from the simple problems of household equipment to highly developed electrical plants. Particular attention is given the development of provision for electrical service in buildings.

SAFETY ENGINEERING

S. J. WILLIAMS
Secretary and Chief Engineer, National Safety Council, Chicago

Safety engineering is an important factor in the design of buildings where large groups of people congregate. The National Safety Council has investigated construction and devices with the greatest minuteness.

FARM SCIENCE

FREDERICK WALTER IVES, B.S., M.E.

President, The Agricultural Engineering Company, Columbus, Ohio. Professor and Head of Department of Agricultural Engineering, Ohio State University.

Specialist in land drainage, soil improvement, surveys, farm arrangement for economical production, purchase of equipment and economical layout of farm buildings with special reference to interior arrangement.

THE FORUM DIGEST

A SURVEY OF IMPORTANT CURRENT ARTICLES ON BUILDING ECONOMICS AND BUSINESS CONDITIONS AFFECTING CONSTRUCTION

The Editors of this Department select from a wide range of publications matter of definite interest to Architects which would otherwise be available only through laborious effort

VALUABLE INFORMATION ON BUILDING COSTS

THE National Federation of Construction Industries has been making an extensive survey on building costs which has resulted in the development of information of direct value to architects who are planning various types of buildings for construction within the near future.

There follows here a composite presentation of some of this information which has been issued in bulletin form by the Federation:

Division of Cost Items in Building Construction

An imaginary composite building has been taken as the basis for presenting these figures. The allocation of costs has been arrived at by taking actual cost figures on seven different types of buildings, including an ordinary two-story brick dwelling of the row type; a detached residence; a reinforced concrete factory building; a slow-burning construction warehouse building; a steel-frame office building; a fireproof and wood floor school building with stone walls, and a brick apartment house.

Here is a tabular presentation, itemized to show the relative value of items entering into the construction of this composite building, together with index figures and actual figures showing the increase in cost of each item, using the costs of the year 1913 as a basis. Column [1] gives average 1913 value in each $100 worth of building; column [2] shows the present average index (1913 as 100); column [3] indicates present amount necessary to obtain same quantity in 1913.

	[1]	[2]	[3]
LABOR (including also local stone cutting and shop work on sheet metal and mill work):			
All skilled labor and supervision	$27.55		
Unskilled labor	9.44		
Office, estimating, general supervision and engineering salaries	5.60		
Liability insurance	1.41		
Total labor (no manufacturing except as noted)	$44.00	160	$70.40
MATERIALS (all delivered at site except cement):			
Lumber, millwork, concrete forms, etc	$8.86	160	$14.16
Bricks	6.10	175	10.68
Steel, structural, miscellaneous and reinforcement	5.93	140	8.30
Heating boilers, heaters, piping, etc	3.05	160	4.88
Plumbing fixtures and piping, etc	2.76	175	4.83
Cement (f.o.b. cars)	2.60	170	4.42
Hardware, nails and similar materials	1.78	170	3.03
Sand	$1.69	200	$3.38
Electric fixtures, conduit, wire, etc	1.60	150	2.40
Stone, slag and pebbles for concrete	1.49	200	2.98
Sprinklers, fire protection apparatus and minor unclassified items	1.04	150	1.56
Building stone	.90	150	1.35
Paint	.76	140	1.06
Roofing and sheet metal materials	.70	200	1.40
Plastering materials (no sand)	.65	200	1.30
Steel sash, etc	.50	150	.75
Lathing materials	.65	150	.98
Lime (no plaster)	.45	200	.90
Glass	.40	200	.80
Cut stone (materials) and terra cotta	.38	150	.57
Elevators	.28	175	.49
Mechanical equipment, cranes, etc	.21	175	.37
Tile and marble (materials only)	.10	150	.15
Total material cost	$42.88		$70.74
OVERHEAD EXPENSE AND PROFIT:			
Office rent, taxes, interest, depreciation of equipment, general expense and overhead (not wages)	$5.80	150	$8.70
Net compensation of all subcontractors (assumed as doing 65% of the work direct)	3.90	150	5.85
Net compensation of general contractor (assumed as doing 35% of the work direct and supervising the balance)	3.42	150	5.13
Total construction and equipment cost	$100.00		$160.82

This table is of particular interest and may be used as a basis of determining the exact effects resulting from cost changes in various classes of building materials and labor.

Better Design Brings Lower Costs

IF construction costs are to be lowered economies must be made, in large measure, independent of material prices and labor rates. Contracts for some loft buildings in a large city were recently closed at index figures of from 130 to 150. These low quotations are particularly due to improvements and new inventions in building construction and construction equipment, also to a change in public opinion regarding the uses of some materials, such as the use of cement floors in lofts for manufacturing and merchandising spaces. Large numbers of buildings are now being built with such floors where formerly tenants insisted on having hardwood. Finished cement floors, if applied directly to the structural concrete, cost and weigh less than wood floors, and the contingent strips and filling incidentally reduce the cost of columns and foundation; cement floors also reduce the length of time required for building, thereby reducing interest charges and overhead on construction.

Timely Building Operations

Present conditions are advantageous in many localities for building homes, hospitals, schools and other necessary commercial, industrial and public buildings or public works, roads, railroads and public utility improvements. Office buildings, hotels, apartment houses, etc., strictly for investment, may be built where index figure of present costs is around 150 or 50% above 1913 prices, quality for quality considered. In most localities it is felt that they can be built at that index by legitimate investors on carefully prepared plans and specifications.

Office Building Demand

REFERRING to the construction of office buildings, the comments of the National Association of Building Owners and Managers are of interest:

"*The need for additional office buildings.* From the information received through our local associations, I do not know of a single city today where there is a shortage of office space. In fact, in some cities, there is surplus space ranging from 10% to 14%. This means that with normal growth, new office buildings will not be required in those cities for a period of from three to five years.

"*The earnings or investment return from office buildings.* Study of 112 buildings in 37 cities, having a total valuation in excess of $112,000,000, showed a net return during 1920 of 4.18%. If the true earnings of office buildings were more generally known, it would result in more careful planning before the buildings are actually started. One effort of our association is to correct some of the errors in design which have resulted in some buildings having a low ratio of rentable area to total area. Some buildings have only 57% of their total area available for renting (or use), on which to show a return.

"*Necessity of analyzing demand.* Before building an office building an owner should make a careful analysis of demand for offices in any city to prove need of building, and then the proper designing of it will increase net returns. One large building owner who refused to follow inflation of values, but held to conservative increases in rentals, *which he is still receiving*, has always enjoyed a large waiting list for space. He did not make such a large return in 1920, but his average return for the five years 1918–1922 will be higher than that received by those who charged all the traffic would bear."

THE STRENGTH OF THE BUILDING SITUATION INDICATED BY FINANCING

UNDOUBTEDLY the most important element in connection with the development of sound activity in the building field is that of mortgage financing. It is, of course, encouraging when large insurance companies and similar sources of mortgage money activity enter the field, but it is of particular interest to follow the activities of an organization such as S. W. Straus & Co., which in placing mortgages and underwriting large building construction issues, represents the attitude of a large number of investors in mortgage securities. In reviewing the general situation toward the end of 1921, S. W. Straus of this company said:

"Construction work throughout the country is holding up well for this season of the year. The building of small homes is proceeding in a gratifying manner, with special activities reported in the New York district and the south. Estimates of the total of new building contracts for the year indicate that in valuation 1921 will be about equal to 1920 which was the record breaking period for the industry. On a square footage basis, however, it would appear at this time that the 1921 total will be less than last year.

"The most important factor at present is that of construction costs, and opinion prevails that the tendency will not be toward lower levels. It should be borne in mind that the law of supply and demand is an irrevocable factor in all economic situations. It is the final and deciding element. Various official and authentic statistics as to the amount of construction necessary to bring the building situation back to normal have been made from time to time. The most conservative of these estimates places the shortage at about $8,000,000,000.

"On the recent annual basis of new building contracts throughout the country (about $2,500,000,000), it will require three years of steady building to overcome this shortage even if we had no new demands, deterioration or loss. But as building work now going on is not of sufficient magnitude to make any perceptible change in the general housing status it is quite within the bounds of good judgment to conclude that we are to have a rather prolonged period of very active building.

"It is contrary to experience to expect continually falling prices in the face of abnormal demands and activities. Consideration also must be given to the revival of general business in this country, and, eventually, throughout the world. A more optimistic tone, in fact, is being manifested continually.

"In addition to these basic conditions, which must certainly have their effect on building costs, it is to be remembered that there are heavy burdens of taxation to be met, that great projects of public works which will demand heavy supplies of labor and materials are pending, and that there is a continued development toward better standards of living and greater conveniences, which mean higher prices.

"While there will be fluctuations in building costs based on local or temporary conditions, and while there may be occasional recessions from high levels, it seems contrary to the dictates of conservative judgment to withhold any worthy or well ordered building project in the expectation of securing pronounced price reductions. We believe in the continued growth of this country and in the steady upbuilding of our great American cities, conditions which inevitably must be accompanied by heavy responsibilities and correspondingly great opportunities."

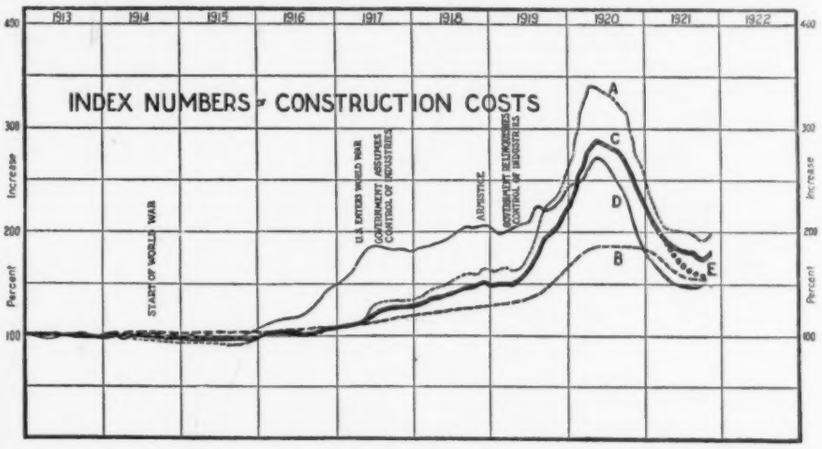
These were not words without deeds. The S. W. Straus Company has recently underwritten a twelve million dollar mortgage bond issue on the General Motors Building in Detroit, has invested several millions of dollars in the furtherance of apartment house projects in New York City and has underwritten sound business projects in many other sections of the country. This activity indicates faith in the building situation which should be encouraging to every member of the building industry. Judging by a recent survey of prospective building operations as carried out by THE ARCHITECTURAL FORUM, this faith in the soundness of the building field is not misplaced and should serve to strengthen the growing conviction of many investors that real estate improved with the type of buildings which meet a definite demand constitutes sound and attractive securities for investment.

Competition Cutting Building Costs

IN a recently issued review of the building situation Monks & Johnson, architects and engineers of Boston, present the following interesting viewpoint as developed through their own experience:

"Present conditions in the building construction market are such that our index curve for 'Cost of Finished Buildings' no longer represents the lowest obtainable cost.

"The building materials index figures of the United States Department of Labor are not based upon competitive prices. They are obtained by getting quotations from material dealers all over the country and averaging the prices in each material.



Curve A. Cost of Building Materials. Curve C. Market Quotation—Cost of Completed Buildings
Curve B. Wages of Building Trades. Curve D. Cost of all Commodities Combined
Curve E. Competitive Cost of Completed Buildings

Then the various materials are properly weighted and combined and a single index figure, referred to 1913 as a base, is obtained each month.

"Quoted prices obtained in this way from dealers are not indicative of the true market in times like those through which we have just passed. In hard times, when business is poor, a material dealer will make very much closer prices with the man who has real spot cash to spend than with the man who is merely collecting general market information. He may even sell at a loss, to move stock or raise cash.

"We have indicated the cost of finished buildings as being 60% materials and 40% labor. As a matter of fact, other elements than these two enter into the contract cost — such as contractor's plant rental, overhead, profit and freight on finished materials. Nevertheless, in normal times, a 60–40 ratio between costs of materials and building-trades labor gives a close approximation of the index of finished building costs.

"But now work is and has been very scarce. Competition has been correspondingly keen, and contractors are willing to make a lesser charge for profits and overhead. They are scaling these items down to a minimum, and are submitting very different lump-sum bids for proposed work than would have been handed in for the same projects in the ampler by-gone days of outside-limit-cost-plus figures.

"Accordingly our index curve of 'Cost of Finished Buildings' (marked 'C' on the chart) indicates market quotations rather than prices obtained by purchasers willing to place immediate orders.

"From our experience and that of other engineers, and of engineering-contractors who have been carrying out construction

work under our supervision during the past three or four months, we have made approximate index figures for winning competitive lump-sum bids on complete buildings. A new curve based on these competitive indices is plotted on the chart for this month and is marked 'E.' At present the competitive index is at about 155 as compared with our index based on government figures of about 181.

"An adequate set of plans and specifications sent out to several good contractors for competitive bids during the next two months should bring in a low bid very little more than half as great again as would have been secured in 1913.

"Here is a definite example of recent competitive prices of industrial buildings. In May, 1921, we secured about ten bids in competition on a medium-sized, reinforced-concrete manufacturing building.

"The lowest bid obtained was approximately $235,000.

"The plans and specifications were again figured in November. The lowest bid then obtained was $195,000. The work will probably go ahead on that basis.

"In the Spring a fair resumption of building activity will tend to stiffen prices, and curve 'E' will rise and tend to coincide with curve 'C.'"

CONSTRUCTION COST AND VOLUME FIGURES

ENGINEERING News-Record of January 5, 1922, presents a general review of the building situation during the past year, together with interesting comparative figures of construction cost in volume.

Following is a table showing the national index of general construction cost in the United States. In describing this index the following statement is made:

"Only the great basic materials and common labor are considered. Steel, cement and lumber are the fundamental materials of the construction industry, and the rate paid common labor eventually determines the cost of labor. The importance of the cost of brick, sand, gravel, crushed stone, and the rest, is not minimized; but these materials are usually produced locally and their prices are subject to fluctuating local conditions.

"The E. N.-R. Construction Cost Index Number is not referred to Boston or Seattle, to Minneapolis or El Paso, but to the 3,507,640 sq. mi. of the United States. Change in towing rates on the Hudson River will affect the price of brick or crushed stone, alongside dock, New York, without making any change whatever in the nationwide cost of construction. On the other hand, a price movement in either steel, cement or lumber wields an influence that is almost invariably continental in scope.

"The E. N.-R. Construction Cost Index Number is based on the prices of steel, cement, lumber and common labor in 1913. Furthermore, these materials and common labor are weighted according to their relative importance as adjudged by *Engineering News-Record*. These weightings are: Steel, 37.50%; cement, 7.14%; lumber, 17.10%; labor, 38%. The weightings were determined by studying the annual production of the three prime materials and the number of common laborers (exclusive of farm labor) in the United States. The markets considered are structural steel in Pittsburgh, cement without bags f.o.b. Chicago; 3 x 12-in. to 12 x 12-in. Southern pine to contractors in New York, and the average price of common labor. The quantities of these materials and the number of man-hours used in computing the Index Number were selected so that the total cost (quantities multiplied by prices, and added together) for 1913 would be $100 for a 'unit of construction.'"

	1914	1915	1916	1917	1918	1919	1920	1921
January	89.22	87.12	130.46	167.75	184.51	198.05	206.55	230.87
February	99.22	87.36	134.46	167.75	184.51	201.50	225.10	230.67
March	99.22	87.66	142.96	175.66	184.51	198.05	240.85	224.27
April	99.22	90.16	147.31	183.41	186.01	191.25	265.20	213.07
May	99.12	90.16	148.86	187.61	186.01	191.25	268.90	210.82
June	97.62	88.96	146.51	199.26	186.31	191.85	273.80	209.82
July	98.12	90.51	145.76	204.01	188.65	193.65	265.65	203.82
August	99.36	91.76	146.56	198.41	193.85	196.65	252.00	193.07
September	100.36	93.01	149.56	190.31	193.85	202.85	255.20	188.27
October	99.76	96.16	152.91	167.11	193.85	202.25	245.20	182.57
November	97.26	101.06	155.66	166.51	193.55	206.85	235.32	166.32
December	97.51	107.06	167.15	167.11	194.75	206.85	251.62	167.82
Averages	98.00	92.58	147.35	181.24	189.20	199.26	251.28	201.78

Engineering News-Record Construction Cost Index Number—1914 to 1921

Volume Index Number

IN addition to the Cost Index Number, the Construction Volume Index Number has been developed in accordance with the following description:

"Its purpose is to show actual amount of construction in pre-war terms rather than the current money value of contracts let. For example: Engineering contracts let in 1921 aggregated $1,231,370,965, against $690,539,644 in 1913. This comparison is spectacular, optimistic, but misleading, because the 1913 dollar was worth 100 cents, whereas the average 1921 dollar by comparison bought only 49½ cents' worth of construction.

"The Volume Index Number is based on 1913 — despite the fact that this was a subnormal construction year by 15 to 25% —for two reasons: 1913 is the last pre-war year, and most index numbers (including the E. N.-R. Construction Cost Index Number) are based on 1913 prices. As a matter of fact, 1913 is normal neither as regards the volume of construction nor the monthly distribution as shown by contracts awarded. To correct the latter condition current monthly volumes are compared with the *average* monthly value of contracts let in 1913. In other words, as an example, the value of contracts in July, 1913, which was $106,011,049, is not compared with the value of contracts let in July, 1921, which was $84,791,980, but with the average monthly value in 1913, which was $57,545,000.

"Letting C represent the value of contracts let in 1913 (or any fraction of 1913), C_1 the value for 1921 (or the same fraction of 1921), I the E. N.-R. Construction Cost Index Number for all or the considered part of 1913, and I_1 the Cost Index Number for all or the same part of 1921, the formula for computing the Volume Index Number is:

$$\textit{Vol. Index No.} = \frac{\frac{C_1}{I_1}}{\frac{C}{I}} = \frac{IC_1}{I_1C}$$

But I and C are constants—100 and $57,545,000 (for any month of 1913) or 100 and $690,540,000 for the whole of 1913; therefore,

$$\textit{Monthly Vol. Index No.} = \frac{C_1}{575{,}450I_1}$$

$$\textit{Yearly Vol. Index No.} = \frac{C_1}{6{,}905{,}400I_1}$$

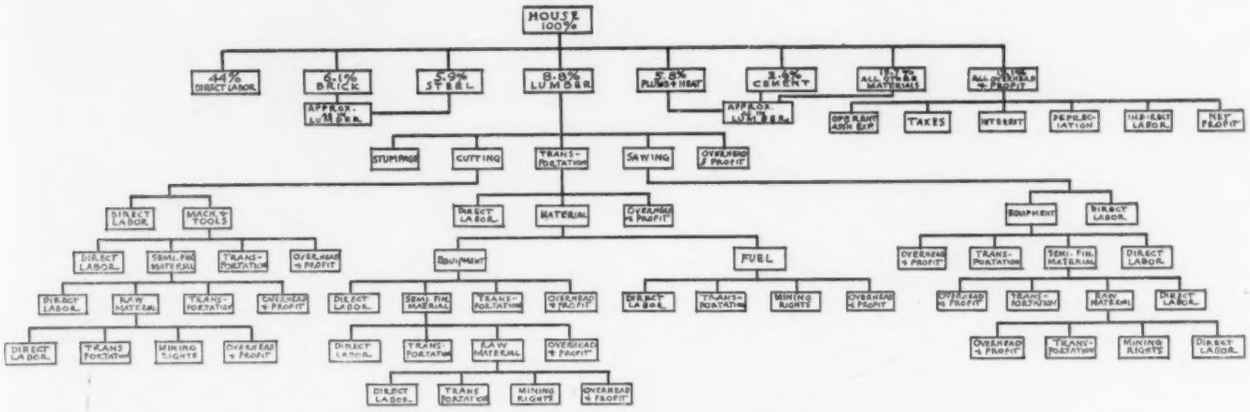
Thus computed, the Volume Numbers for the months of 1921 and for the entire year were as shown below:

Engineering News-Record Construction Volume Index Number, 1913 to 1921

1913 (entire year)	100
1921 (entire year)	88
1920 (entire year)	91
1921	
January	41
February	43
March	88
April	86
May	90
June	117
July	90
August	94
September	114
October	109
November	101
December	118

ALLOCATION OF COSTS IN DWELLING CONSTRUCTION

SANFORD E. THOMPSON of the Thompson & Lichtner Company has recently prepared for the *Boston Evening Transcript* an unusually interesting chart showing the number of items which actually enter into the cost of a dwelling. This chart follows operations from the source of raw materials to the finished house and it is unusually interesting to note how labor enters into every state of the operation. In addition to the chart presented with this article there will be found a tabulation of costs based on the cost of an imaginary composite building as prepared by Mr. Thompson. These percentages are of value in determining the degree to which reductions in materials and labor affect the cost of the complete building and have been thus worked out:



The Genealogy of a House, Prepared by the Thompson & Lichtner Company, Boston

Labor	**44.00%**
Skilled labor and supervision	27.55
Unskilled labor	9.44
Office, estimating, general supervision, engineering	5.60
Liability insurance	1.41
Material	**42.88**
Lumber	8.86
Brick	6.10
Steel	5.93
Boilers, heating, piping	3.05
Plumbing	2.76
Cement f.o.b. cars	2.60
Hardware, nails, etc.	1.70
Sand	1.69
Electric fixtures, conduit	1.60
Stone, slag, pebbles	1.49
Sprinklers, unclassified items	1.04
Building stone	.90
Paint	.76
Roofing and sheet metal	.70
Plastering (no sand)	.65
Lathing	.65
Steel sash, etc.	.50
Lime (no plaster)	.45
Glass	.40
Cut stone and terra cotta	.38
Elevators	.28
Mechanical equipment (cranes, etc.)	.21
Tile and marble	.10
Overhead expense and profit	**13.12**
Office rent, taxes, interest, depreciation, general expense and overhead	5.80
Net compensation (subcontractors)	3.90
Net compensation (general contractor)	3.42
Total	**100.00%**

LOAD REQUIREMENTS IN BUILDING CODES

MANY architects are interested in the question of standardizing building codes. For purposes of reference in discussing this subject, therefore, the following article will be of interest. This article appeared in *The American Contractor* for December 24, 1921, written by Richard G. Kimbell of the Architectural and Building Code Bureau of the National Lumber Manufacturers' Association.

"Of 1,478 cities of over 5,000 population in the United States, only 410 or 27% of them, so far as has been determined, have a building code.

"By persistent effort, a library of the codes of some three hundred cities has been accumulated. A careful study of them reveals some decidedly interesting and significant facts. This article will discuss only the live load requirements in the various codes. As the codes of cities located in close proximity to a larger city generally have similar requirements to those of the larger city, a group of 65 widely scattered cities of over 25,000 population was taken as being representative and their codes examined to determine if the suspicion of a wide variation was founded on fact or surmise.

Dwelling Loads Range from 30 to 80 Pounds

POSSIBLY the most interesting of the variations brought out in this tabulation, and one of the greatest significance to home owners and builders, referred to dwelling loads. These range from 30 to 80 pounds per square foot for the first floor, 30 to 50 pounds per square foot for the second floor and 20 to 40 pounds for the attic. Is there rhyme or reason in this? Is a dwelling in City A liable to greater loads than one in City B? Generally the spans of joists are limited by deflection to prevent plaster cracking. On that basis a 2x10 will carry a 30-lb. load over a 16 ft. 3 in. span, while the same timber will carry an 80-lb. load for only 13 ft. 0 in. Thus poor Jones in City A, where they require dwelling house floors constructed to accommodate a live load of 80 pounds per square foot, must use a 2 in. by 12 in. joist for a 15.8 ft. span, while Brown in City B, who only has to provide for a 30-lb. load, uses a 2 in. by 10 in. joist for a span 7 in. greater than Jones with less lumber for each of his floor supporting members than Jones used. Is this fair? If the 30-lb. load requirement is safe, what a great economic waste and needless hardship is caused by an 80-lb. requirement. If, however, a floor built to accommodate 80 lbs. per square foot is the absolute minimum for safety and stability, this man Brown who builds to accommodate only 30 lbs. has erected a house of cards and created a hazard to the occupants of his building.

Occupancies and Ranges of Live Loads

THE following is a summary in tabular form of the occupancies and the ranges of the live loads for the 65 cities:

Occupancy	Range of loads in lbs. per sq. ft.
Dwellings—	
1st floor	30— 80
2nd floor	30— 50
Attic	20— 40
Tenements & Apartments—	
1st floor	30— 80
Above	30— 50
Stores, Light Mdse.—	
1st floor	75—150
Above	100—125
Stores, Heavy Mdse.—	
1st floor	120—250
Above	200
Warehouses—	
Heavy	150—250
Light	100—150
Factories—	
Heavy	150—250
Light	100—150
Roofs—	
Pitch 20° or less	20— 50
Pitch of more than 20°	15— 50
Assembly Halls, Theatres, Etc.—	
Movable seats	80—125
Fixed seats	50—125
Drill	100—250
Dances	100—200
Rooms	40—120
Schools—	
Corridors	60—125
Assembly	75—125
Office buildings	40—100
Public buildings	50—150
Stairways & Fire—	
General	60—125
Escapes—	
Assembly	100—125
Garages—	
Public	70—175
Private	40—125
Grandstands	80—125
Hotels—	
Rooms	30— 75
Corridors	60—125
Hospitals—	
Rooms	30—100
Corridors	80—100
Sidewalks	150—500

The loads for roofs having a pitch of more than 20 degrees from the horizontal

vary from 15 lbs. to 50 lbs. per square foot. Oh yes, someone remarks, that variation is accounted for by the fact that a city with a 50-lb. load provides for a snow load in addition to the other loads, while the city with a 15-lb. load is probably in the southern part of the country where they have no snow loads. That would seem logical, but is, however, not borne out by the facts. Although southern cities as a rule have lower roof load requirements than the northern cities, this does not hold true in all cases. One city with a 15-lb. load is within 200 miles of a city with a 50-lb. load, and both are in the northern New England States. Indeed the 15-lb. load city is about 150 miles north of the city having the greater load. Roof loads should undoubtedly vary according to climatic conditions, but the particular instance cited shows clearly that in many cases, they are not within reason. Such variations in cities where conditions are similar prove the majority of our building laws are based neither on logic nor judgment.

Variations Prohibit Standardization

FURTHER, what of the variations of from 30% to 100% for industrial buildings? And what about the great variance in the quantity of materials required in this type of structure? This question, however, hardly needs discussion, as a practical engineer will readily realize the loss, waste and inconvenience of such different standards, and when brought to his attention, will generally make an effort to right the wrong. With the prevailing ordinances should his practice be wide and diversified, and distributed over a considerable territory, he must have in his possession the building laws of all the cities where he erects structures to be able to meet the local requirements in his designing.

" Furthermore, such variations prohibit and prevent standardization in the design of various structural units otherwise entirely possible.

"The opinion is held by some that where the requirements as to floor loads are low, the allowable unit stresses for structural materials are correspondingly low, and where the live loads are high, the attending stress values are also high—thus in a way balancing the variations so that approximately the same amount of material would be used in both localities for a building of the same character. This, however, is not true in the majority of cases. A city with high load requirements may have the same allowable unit stress for materials as a city with low loads and vice versa."

INCREASE IN UNIT COSTS

THE most recent bulletin of the Philadelphia Club of Commerce presented an interesting tabulation on small dwelling costs based on operations of 100 or more houses prepared by Daniel Crawford, Jr., President of the Operative Builders' Association.

The figures show that dwellings authorized for construction up till the end of May, 1921, are mostly of the small six-room type, which is easily within the reach of the average wage-earner, who is most in need of relief. Mr. Crawford points out that the unit costs represent the bare price of the buildings without land, financing, overhead or utility charges made by the city. The figures follow:

Year	No. of Dwellings Erected	Total Cost	Average Unit Cost
1913	4972	$12,845,710	$2,583.60
1914	6921	15,531,495	2,244.00
1915	9493	21,808,725	2,297.30
1916	7754	20,872,315	2,691.80
1917	2728	8,381,055	3,072.23
1918	965	3,342,710	3,464.00
1919	5291	27,740,765	5,243.00
1920	1272	12,385,400	9,737.00
1921 (5 mos.)	507	2,970,725	5,859.42

Engineering News-Record Comparison of Spring Construction Material Prices Since 1913
All Prices New York Unless Otherwise Noted

	Portland Cement, per bbl. net, with-o't bags, Chicago	Southern Pine, 3x12 to 12x12, 20 Ft. and Under	Common Brick (per M.)	Crushed Stone (per Cu. Yd., 1 In.)	Sand (per Cu. Yd.)	Gravel (per Cu. Yd., 1-in.)	C.-I. Pipe (6 In. per Ton)	Beams and Channels (3–15-in. per 100 lb.	Beams, Etc., Pittsburgh Mill	Reinforcing Bars, 2-in. and Larger Pittsburgh Mill	Reinforcing Bars, 1-in. and Larger	Steel Sheetpiling, Pittsburgh Mill	Tank Plates 1-in. and heavier per 100 Lb.	Hollow Tile (6x12x 12 per Block), Factory, Perth Amboy, N. J.	Linseed Oil (Raw in Barrels)	Freight to Pittsburgh on Steel (per 100 Lb.)
April, 1913	$1.19	$28.50	$7.00	$0.90	$0.50	$0.85	$24.00	$2.15	$1.70	$1.50	$2.25	$1.60	$1.61	$0.084	$0.48	$0.16
May, 1913	1.19	28.50	7.00	0.90	0.50	0.85	23.50	2.15	1.65	1.50	2.25	1.60	1.61	0.084	0.50	0.16
June, 1913	1.19	28.50	7.00	0.90	0.50	0.85	23.00	2.15	1.50	1.50	2.25	1.60	1.61	0.084	0.48	0.16
Average	$1.19	$28.50	$7.00	$0.90	$0.50	$0.85	$23.50	$2.15	$1.62	$1.50	$2.25	$1.60	$1.61	$0.084	$0.49	$0.16
April, 1914	$1.12	$28.50	$5.50	$0.95	$0.50	$0.90	$22.00	$1.95	$1.15	$1.20	$2.25	$1.60	$1.31	$0.084	$0.54	$0.16
May, 1914	1.12	30.00	5.50	0.95	0.50	0.90	22.00	1.85	1.15	1.15	2.25	1.60	1.31	0.084	0.54	0.16
June, 1914	1.12	30.00	5.60	0.95	0.50	0.90	20.50	1.85	1.10	1.15	2.25	1.60	1.31	0.084	0.53	0.16
Average	$1.12	$29.50	$5.55	$0.95	$0.50	$0.90	$21.50	$1.85	$1.13	$1.17	$2.25	$1.60	$1.31	$0.084	$0.54	$0.16
April, 1915	$1.11	$28.50	$5.50	$0.90	.....	$0.85	$20.00	$1.90	$1.15	$1.15	$1.95	$1.60	$1.36	.....	.....	$0.169
May, 1915	1.11	28.50	5.75	1.05	.....	0.85	20.50	1.90	1.20	1.15	2.00	1.50	1.32	.....	.....	0.169
June, 1915	1.15	26.50	6.00	1.05	....	0.85	22.00	1.90	1.20	1.20	2.00	1.50	1.37	.....	.....	0.169
Average	$1.12	$27.75	$5.75	$1.00	.....	$0.85	$20.75	$1.90	$1.18	$1.17	$1.97	$1.53	$1.35	.....	.....	$0.169
April, 1916	$1.42	$31.50	$8.50	$0.95	$0.40	$0.80	$30.50	$2.50	$2.50	$2.45	$3.10	$2.50	$2.50	.....	$0.81	$0.169
May, 1916	1.46	31.50	7.25	0.95	0.40	0.85	30.50	2.50	2.75	2.50	3.25	2.50	2.65	.....	0.81	0.169
June, 1916	1.46	30.50	8.00	0.95	0.50	1.00	30.50	2.60	2.75	2.50	3.10	2.50	2.75	.....	.....	0.169
Average	$1.45	$31.00	$7.90	$0.95	$0.45	$0.90	$30.50	$2.55	$2.67	$2.47	$3.15	$2.50	$2.65	.....	$0.81	$0.169
April, 1917	$1.76	$32.75	$9.50	1.20	$ 0.50	$1.25	$47.50	$3.75	$3.88	$3.35	.....	.....	$5.00	.....	$1.04	$0.169
May, 1917	1.90	34.75	11.50	1.25	0.50	1.35	55.50	3.80	4.00	3.50	.....	.....	5.50	.....	1.21	0.169
June, 1917	1.91	39.75	10.25	1.25	0.50	1.25	55.50	5.00	4.31	3.50	.....	.....	7.00	.....	1.31	0.169
Average	$1.86	$35.75	$10.40	$1.25	$0.50	$1.30	$51.70	$4.15	$4.06	$3.45	.....	.....	$5.80	.....	$1.19	$0.169
April, 1918	$1.96	$42.75	$10.25	$1.75	$1.25	$2.00	$55.35	$4.20	$3.00	$2.90	$4.09½	$3.10	$4.45	$0.14	$1.55	$0.195
May, 1918	1.96	42.75	10.00	1.75	1.25	2.00	55.35	4.20	3.00	2.90	4.09½	4.00	4.45	0.14	1.55	0.195
June, 1918	2.00	43.25	10.25	1.75	1.25	2.00	61.35	4.20	3.00	2.90	4.09½	4.00	4.45	0.14	1.58	0.195
Average	$1.97	$43.00	$10.15	$1.75	$1.25	$2.00	$57.35	$4.20	$3.00	$2.90	$4.09½	$3.70	$4.45	$0.14	$1.56	$0.195
April, 1919	$2.00	$45.00	$15.00	$1.75	$1.25	$2.00	$57.70	$3.47	$2.45	$2.35	$3.37	$2.55	$3.67	$0.159	$1.55	$0.27
May, 1919	2.00	45.00	15.00	1.75	1.25	2.00	57.70	3.47	2.45	2.35	3.37	2.55	3.67	0.153	1.63	0.27
June, 1919	2.00	46.00	15.00	1.75	1.25	2.00	52.70	3.47	2.45	2.35	3.37	2.55	3.67	0.153	1.76	0.27
Average	$2.00	$45.50	$15.00	$1.75	$1.25	$2.00	$56.03	$3.47	$2.45	$2.35	$3.37	$2.55	$3.67	$0.155	$1.65	$0.27
April, 1920	$2.00	$72.00	$18.00	$2.00	$1.25	$2.25	$72.30	$5.00	$4.00	$4.00	$5.00	$3.65	$5.00	$0.2274	$1.87	$0.27
May, 1920	2.09	70.00	18.00	2.15	1.50	2.50	76.30	5.00	4.00	4.00	5.00	3.65	5.00	0.2274	1.87	0.27
June, 1920	2.15	70.00	18.00	2.15	1.50	3.00	76.30	4.47	4.00	3.75	5.00	3.65	4.67	None	1.73	0.27
Average	$2.08	$70.50	$18.00	$2.10	$1.42	$2.58	$74.97	$4.83	$4.00	$3.92	$5.00	$3.65	$4.89	$0.2274	$1.83	$0.27
April, 1921	$2.17	$48.00	$16.00	$1.95	$1.25	$2.50	$63.30	$3.33	$2.00	$2.00	$3.28	$2.55	$2.00	.....	$0.73	$0.38
May, 1921	2.17	48.00	15.00	1.95	1.25	2.50	63.30	3.33	2.20	2.10	3.38	2.55	2.40	.....	0.67	0.38
June, 1921	2.17	43.00	14.50	1.95	1.25	2.50	58.30	3.33	2.20	2.10	3.38	2.55	2.40	$0.1156	0.80	0.38
Average	$2.17	$46.25	$15.00	$1.95	$1.25	$2.50	$61.60	$3.33	$2.15	$2.10	$3.35	$2.55	$2.25	$0.25	$0.73	$0.38
General Average	$1.66	$39.69	$10.53	$1.40	$0.79	$1.54	$44.21	$3.16	$2.47	$2.34	$2.83	$2.19	$3.11	$0.1045	$0.98	$0.216
Dec. 15, 1921	$1.97	$47.50	$14.50	$1.85	$1.00	$1.75	$48.00	$2.58	$1.50	$2.68	$1.50	$1.80	$2.78	$0.128	$0.72	$0.38

SERVICE SECTION
of THE ARCHITECTURAL FORUM

Information on economic aspects of construction and direct service for architects on subjects allied to building, through members of THE FORUM Consultation Committee

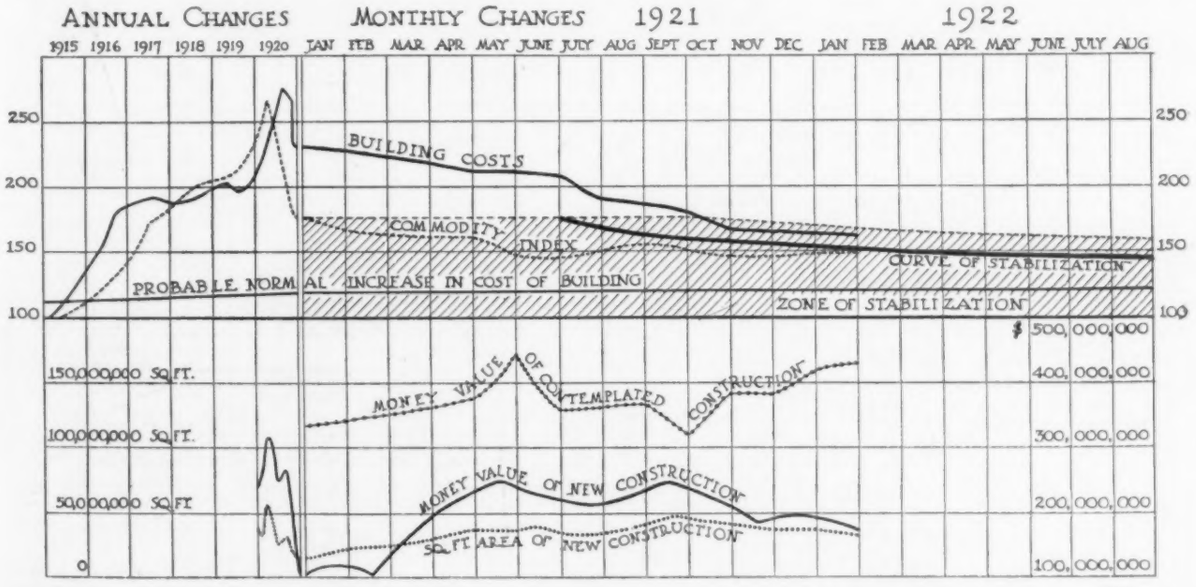
The Building Situation

ALL signs seem to indicate that we have made no mistake in predicting a sound volume of construction for the year 1922. The various figures of construction activity which have been received in this office are of interest in that they show the volume of new construction activity nearly 50% greater than for the same period last year and that the contemplated work reported is increasing in volume and is considerably greater than at a similar period last year.

Attention is directed to certain changes and additions in the graphic chart presented here. We have added to this chart a trend line which indicates the money value of contemplated construction. It will also be noted that the trend line of building costs has been weighted by the increase in labor efficiency and by the saving due to stiffer competition in the contracting field. This is a more accurate representation of actual conditions today, as explained in the following page. An examination of the graphic chart below indicates that building costs are still keeping within the zone of stabilization, and even showing slight reductions when efficiency and competition are considered; these elements excluded would cause the index line to rise, due to price changes in some basic materials.

The lines which indicate money value and square feet of new construction are tending downward. This is a seasonal slope and is due to the falling off of building during cold weather. Judging by the trend of the line of contemplated construction, together with other indications, it would seem that the spring and summer months will show a considerable upturn of these lines.

An increase in construction volume will undoubtedly have a tendency to push up the index line of building costs. These slight rises we expect will appear in April and May and again in September and October. Outside of this, the average trend of building costs will, we believe, be slightly downward, approximating quite closely the line marked in the chart as "the curve of stabilization."



THIS chart is presented monthly with trend lines extended to the most recent date of available information. Its purpose is to show actual changes in the cost of building construction and the effect upon new building volume and investment as the *index line of building cost* approaches or recedes from the "curve of stabilization."

The CURVE OF STABILIZATION represents the building cost line at which investors in this field may be expected to build without fear of too great shrinkage in the reproduction value or income value of new buildings. The index line representing actual cost of building entered the ZONE OF STABILIZATION in the fall of 1921. If this cost line passes *out* of the zone of stabilization, building volume will decrease materially.

The degree of the curve of stabilization is based on (a) an analysis of time involved in return to normal conditions after the civil war and that of 1812; (b) the effect of economic control exercised by the Federal Reserve Bank in accelerating this return after the recent war, and (c) an estimate of the probable normal increase in building cost.

Factors of Fluctuation in Building Costs

The chart shown at right indicates price movements in several important factors of building construction cost. These affect trend of cost line in chart shown on the preceding page.

THE accompanying graphic chart is presented for the purpose of showing fluctuations in a number of important building materials and in labor costs. These fluctuations are presented over a period of three months and will be shown in each issue of the Service Section in order to make possible at least a partial analysis of the building cost trend line shown on the preceding page.

During this season of the year prices in most building materials are holding quite steadily and there are no changes which are deemed worthy of serious comment. The chart indicates a slight reduction in structural steel and cement prices. An announcement of an average 22% reduction in glass was made in January by a manufacturer producing about one-third of the domestic supply.

There are two points, however, which should be brought out definitely at this time because they directly affect the trend of building costs. These are the increase in production efficiency of labor in the building trades and decreased cost due to competition among sub-contractors and general contractors. It is at best difficult to discuss this question of increased efficiency of labor and more difficult to attempt its measurement. In discussing the matter with an official of the Northeastern Construction Company, however, we found that this organization, because of its methods of keeping time records, has been able to measure to a fairly dependable degree the amount of production since 1914 of these labor groups in the building trades:

Common labor
Masons
Carpenters

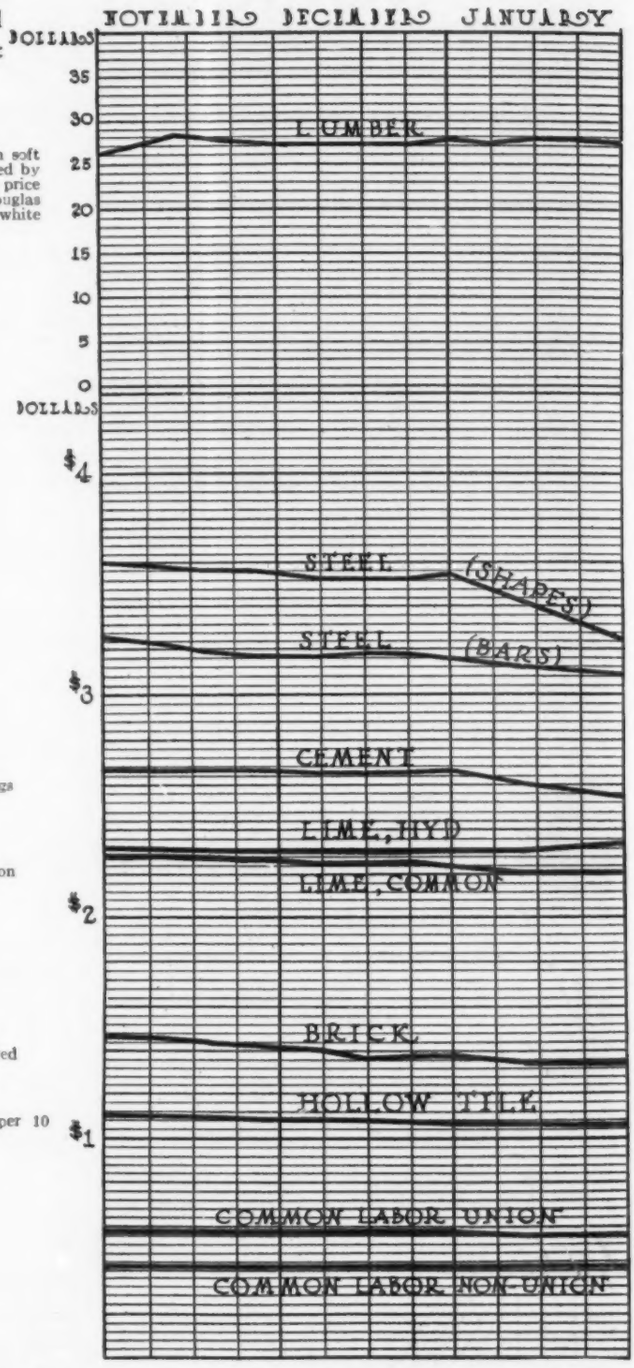
Based on 100% production in 1914, it was found that in 1920 an equal number of working hours in these classes was producing according to these figures:

Common labor	40%
Masons	55%
Carpenters	80%

A similar comparison in January, 1922, shows common labor returned to a normal basis of production of 100%, masons producing 90% and carpenters producing 92%. In other words, a fair attempt at measuring this elusive quantity would show a considerable increase in production of labor.

It is, of course, a recognized fact that during periods of keen competition for work, the bids of sub-contractors and contractors will be trimmed closely. In many instances, the contractor is willing to work at practically no profit in order to carry the overhead of his organization. In the February issue of THE FORUM, we presented a division of cost items in building construction which showed skilled labor representing about 28% of the cost, common labor about 9%, and overhead expenses with contractors' profit about 13%. It is apparent that if these items had been affected by an increase in production on the part of labor and by a decrease of overhead and profit on the part of contractors, the general trend of building costs would be still downward at the present time, offsetting the slight increase resulting from a rise in the prices of materials. Examination of bids being taken in various architectural offices, together with contracts which are being carried out at present, would seem to indicate this fact and the soundness of the statement that we are still in a period of declining building costs.

The reductions estimated because of greater labor efficiency are based on labor data collected in New York and vicinity. They should apply in general to other sections because building labor has been quite fully employed in New York on a large program of apartment and house building arising from tax exemption, and it may be argued that as great an incentive to increased production has not held there as in other centers.



Lumber
Price trend line based on soft wood price index presented by *Lumber*. This indicates price variation of yellow pine, Douglas fir, hemlock, N. C. pine, white pine, cypress and spruce

Steel
Structural shapes
Price per 100 lbs.

Reinforcing bars
Price per 100 lbs.

Cement
Price per bbl. without bags

Lime
Finishing
Hydrated, price per 1/10 ton

Common lump
Price per bbl.

Brick
Common, per 100 delivered

Hollow Tile
Partition, 4 x 12 x 12, per 10 blocks

Common Labor
Union
Rate per hour

Non-union
Rate per hour

Figures used in developing all trend lines represent average prices to contractors in following cities: New York, Chicago, Denver, Seattle, Minneapolis, Atlanta, Dallas and San Francisco

Trade Schools and the Building Trades Unions

By FREDERICK L. ACKERMAN

A NEWS item in the *New York Times* of December 26, bearing upon conditions in the building trades, is well worth quoting. It is not that the facts "revealed" are revelations to architects, but what it is proposed to do that merits attention. Particularly is this true of the editorial which accompanied the publication of this news item.

From the news item we learn that: "It has been revealed that the shortage of skilled mechanics in the Eastern building field is one of the fundamental reasons for the present high cost of building erection. The manufacturers of material going into building construction are finding that their production is being curtailed, and that distribution is often wastefully clogged, because of the constantly growing shortage of skilled artisans. In some departments of the building industry there is a shortage of almost 50 per cent of mechanics capable of doing expert work.

"Investors have pressed the manufacturers and distributors of materials, as well as building trades contractors, with the question as to what they are doing collectively and individually to bring the supply of labor up to something even approaching the building requirements of next year, according to present estimates. Their reply is in the form of a plan to apply the principle of the intensive trade school system used by the government in war time, whereby young men could take up a course of intensive training in the use of various engines of destruction. The plan is to turn this toward training young men in the use of instruments of construction."

* * *

"We are told that an intensive course of 100 hours under the conditions of instruction as outlined in the curriculums of the public vocational schools, the Y. M. C. A., Y. M. H. A., Knights of Columbus and similar institutions, will be sufficient to give an alert young man a pretty fair start toward acquiring a rating as a competent journeyman. It at least tends to the solution of one of the biggest problems of 1922 and succeeding years."

From the editorial we are given an insight into the significance of this move, for under the caption "Trade School and Union" the news is interpreted by the editorial writer:

"In a cautious statement, The Dow Service Daily Building Reports tells of a new movement that seemingly is aimed at the closed union. Of the several factors that have kept building costs and rents at their war time heights, the most effective is the present arbitrary limitation of the supply of labor in the building trades. Manufacturers of building material are urging that if they are to lower their prices they must run their plants to capacity, and that they cannot do this so long as the supply of workmen is insufficient. Investors have come to a similar conclusion. If new buildings are to be profitable, not merely for the present but in the future of deflated rentals, and if the financing of them is to be facilitated by mortgages, it is essential that the supply of labor shall make possible speedy and economic construction. To building contractors especially, an opening up of the unions is indispensable. Labor supply is the neck of the bottle.

MOST architects have consistently refrained from taking an interest in the differences between capital and labor. Their position offers opportunity, however, for helpful cooperation when it is reinforced by a clear understanding of fundamentals. Mr. Ackerman presents a commentary on conditions in sections but little affected by unionism. Later articles will discuss other phases that have come under the observation of architects and others in the industry.

A Journeyman in 100 Hours

"Under ordinary circumstances, three months suffice to turn out a journeyman, and four months a qualified foreman. With intensive training, it is said that a journeyman can be qualified in 100 hours. Hundreds of young Americans, many of them ex-service men having high school and college educations, are idle and in want. That they should be arbitrarily debarred from employment is an injustice, not merely to them but to thousands of families that are now paying impossible rentals.

"The extent to which the building trades unions have developed a monopoly of labor would be incredible if it had not been made manifest. At the Community Church recently four artisans who were out of work and had come to New York to find it testified that they were debarred from the union because they could not pay the initiation fee, usually $200. One of them was an expert electrician. The probability is that even if these men had offered the initiation fee reasons would have been found to exclude them. The Lockwood Committee lately unearthed a case in which a union was actually smaller than it was a decade ago, with the surviving members all 50. Either in the law or in its enforcement there is clearly a grave defect."

So this 100 hours of intensive training is the "solution" of the complex and vexing problem brought on by the closed shop and the action of the trade unionists in developing a monopoly of labor. One may with propriety question the value of an attempt to create journeymen or near journeymen in 100 hours of training, be it ever so intensive. And there is some doubt as to what would happen to that body of knowledge which is alone carried by the craftsmen and which must be so carried in order to effect advancement in the state of the industrial arts. This knowledge is of a different sort than that which is represented by the ability to *use* "war time engines of destruction." But precisely what should be done about it is a question which had best be considered following an understanding of what is the matter. So we will do well to pass over this point.

The *Times*' editorial opinion conforms to general opinion as to what has made for the decay of skill, the shortage of skilled workmen and the falling away of apprentices in the building trades. Apparently it is all due to the outlook of trade unionists and the monopolistic control of trade unions over labor. It is this and the stream of consequences which flows from it. In a word, it is trade unionism.

That effort to control the supply of labor falls within the aims of unionism; that this effort takes effect in a limitation of apprentices and curtailment of output is hardly to be denied by the most partisan advocate of trade unionism. For a shortage of labor, under our economic system, is a blessing when viewed from the laborer's viewpoint, just as a short supply of cotton is a blessing to those who have cotton to sell. But trade unionism as yet is limited in its application; it covers, both as regards the outlook of workers and the application of trade union principles, but a meager proportion of those who still engage in materially productive work.

Decay of Skilled Labor Not Confined to Union Districts

One has no more than to make inquiry concerning the present situation—what has taken place and what is going on in our rural areas, up-state towns and villages—to be made fully aware that the decay of skill and workmanship, the shortage of skilled workmen and the falling away in numbers among those entering the building trades, have taken effect more thoroughly in the rural areas than in the urban centers and industrialized areas where unionism may be said to have gained partial control. And further inquiry will reveal the fact that in

the areas outside the industrial centers, trade unionism and the trade union outlook have played no part in shaping the course of events. In hundreds or even thousands of towns and villages in the Eastern states the physical evidence of the decay of workmanship and skill stares back at one passing through the streets. Where once the well trained Yankee carpenter plied his trade and left evidence of the pride he and his employers took in his day's work, now the untrained, bungling workman does the building for those who care little for the kind of work he does. And to these who do this clumsy building, trade unionism is a completely idle matter. As for restraint upon the young man who would enter one of the building trades, it does not exist in these rural areas—not in the guise of fellow workmen who would bar his entrance.

Some Actual Barriers

But barriers exist nevertheless. The fact that in these areas there is no one who is capable of teaching a young man —that stands as a barrier. And as a further barrier stands the fact that the services of the really skilled craftsman are not wanted except upon occasion. Hence it would seem that before we may deal wisely—in fact before we may deal at all —with the conditions which we deplore we should take fully into account the fact that the outstanding characteristics of the situation as regards the decay of skill and the falling away of apprentices are the same whether the area falls within the sweep of trade unionism or lies far afield. The point is, therefore: what has given rise to these outstanding characteristics?

Perhaps the remedy proposed may be used to shed light upon this question. 100 hours to prepare the journeyman! But what kind of a journeyman? What stands behind this demand? Can it be that it is no more than the *Times* suggests—a move aimed at the closed union? Certainly we may not expect skilled craftsmen to result from 100 hours of training. Out of such a course would come the bungler, capable of performing but a few operations, but eminently useful for the purpose of erecting cheap, shoddy buildings.

Cheap, shoddy buildings! What proportion of the structures which we build annually falls within this general class? How should we classify the bulk of new tenements, apartment houses, single and two-family houses, erected by speculative builders, which go to enlarging our urban centers? How should we classify the village stores, the main street architecture, the garages, the "bungalows," the built-over houses which go into the making of our towns and villages? Would the owners and the promoters of this vast mass of new building give employment or encourage the workman with the workmanlike outlook which was the Yankee carpenter's a century ago?

Skilled Work Not Wanted

Anyone who is in touch with the present situation and who takes into account the motives and the outlooks of those who cause the bulk of modern buildings to be erected, knows full well that the standard of workmanship which produced our colonial buildings is not wanted today. Not only is it not wanted, but so much regard for building well on the part of the workman will not be tolerated by those who build the majority of buildings. Why do we pass the buck of responsibility to trade unionism? Are not the facts as revealed in urban centers and in areas untouched by unionism sufficient to show that responsibility covers a far wider field? Or are we under the control of a preconception that trade unionism is an alien factor—something which is not a part of the present institutional scheme?

A comprehensive theory of modern industry would fall within the frontiers of a theory of business traffic, for modern industry turns upon business traffic. And in such a theory trade unionism, as it has taken shape in the building trades of America, would not be viewed as alien or as moving in the direction of socialistic experiment. In its broader outlines, unionism in the building trades would appear largely as an attempt to apply the outlook of business men and the ways and methods of business traffic to the matter of selling time. If we may judge by what has been disclosed by the inquiries into the building trades in Boston, New York and Chicago, unionism in the building trade appears, not as a challenge to the present institutional scheme, not as a move toward socialism or what not, but as a challenge to business men to meet in conflict on the field of business traffic. And the weapons chosen are those of business men—control of output and monopolistic advantage.

If anyone doubts the truth of this assertion, let him attempt to explain the activities of the modern building trade unions in terms of socialism, communism or Bolshevism. In the jargon of these isms, the moves, the activities and the objects of the trade unionists appear as capitalistic moves. Only when we resort to the jargon of business traffic can we understand and explain what trade unionism in the building trades is all about. Follow any discussion of matters in dispute between the business agents of the unions and the representatives of employers or of employing associations, and the truth of this will be obvious. The discussion will be found to revolve about buying and selling, about pecuniary transactions and relationship. Purposes and objects may be expressed only in terms of business traffic,—that is to say, in terms of price. And it is upon such terms that the discussion comes temporarily to rest.

Opinion has it that the workman should view his work as a matter of producing goods—not as a businesslike matter of selling his time at a price. But unfortunately for those who would have him remain a workman with a workmanlike outlook, he has been shown the immediate pecuniary advantage which may follow such a businesslike move as cornering the labor market, or curtailing production, or in "selling dear." And out of some little experience he has grown to be something of a business man in his own way. So it would seem that between the business man who sells commodities for all that can be obtained for them as a result of businesslike maneuvers of one sort and another, and the workman who sells his time in the same way, not much may be looked for in the way of workmanship even though we propose to turn out the journeyman in 100 hours.

An Analysis of the Building Shortage

By COL. LEONARD P. AYRES

AT the recent conference of the Associated General Contractors of America, held in Cleveland, Col. Leonard P. Ayres, Vice-president of the Cleveland Trust Company, presented some interesting facts and figures regarding the building shortage. He expressed the belief that prices will continue to fall, intermittently, for 10 or 20 years more, but conveyed assurance that the construction industry will be immune to many of the embarrassments of the coming period, because it supplies a market in which there is a latent demand equal to 2¼ years' normal production of building. "In other words," said Col. Ayres, "construction can go along for 9 years at 25 per cent above normal and only fill the normal demand by the end of that time."

Col. Ayres said that building finance problems had commenced to adjust themselves, through greater abundance of money. "The acrimonious discussions between yourselves as contractors and ourselves as bankers are about over," he remarked. "Within six months so much money will be available for borrowers that owners will be able to arrange building loans on the usual pre-war terms."

Charts shown by Col. Ayres indicated a sub-normal volume of building for every year since 1912. Even the apparently large building figures for 1919 and 1920 were only apparent, he declared. The cost was large but the building was far behind even the current needs of the time. The only time in the last 9 years when the volume has gone above average requirements was for the last few weeks of October, 1921. This was chiefly residence building, but it shows, in Col. Ayres' opinion, that the tide is rising rapidly. He declared that building prosperity is always the first indication of a general revival and that it disseminates prosperity more widely than any other type of activity.

THE FORUM CONSULTATION COMMITTEE

A group of nationally known experts on various technical subjects allied to building, providing a direct service to architects

THE editors of THE ARCHITECTURAL FORUM have been fortunate in obtaining the co-operation of the following recognized experts who constitute THE FORUM Consultation Committee. This Committee provides a service of the greatest value to subscribers in addition to the usual editorial service, and architects who seek information on specific questions in these various fields are invited to present inquiries.

The basis on which this Committee has been organized is:

(*a*) That each Committee member shall be a representative leader in his line;
(*b*) That no Committee member has affiliations with any manufacturer;
(*c*) That no Committee member will be called upon for detailed service except by special arrangement;
(*d*) That a special editorial article on a subject represented under each of the headings below shall be prepared during the year by the Committee member.

SUBJECTS AND COMMITTEE PERSONNEL

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WALTER STABLER
Comptroller, Metropolitan Life Insurance Co.

The largest institution in the United States making loans for building construction. Mr. Stabler's knowledge of building investments covers the country and is widely recognized.

CO-OPERATIVE FINANCING

FREDERIC CULVER
President, Culver & Co., New York

A specialist in the financing and development of co-operative house projects. Mr. Culver has successfully developed approximately 25 million dollars' worth of co-operative apartment houses. He is an attorney and has had long experience in financing and construction of this nature.

REAL ESTATE

C. STANLEY TAYLOR

Widely experienced in real estate development and financing, real property law, architecture, engineering and building construction. Financial and Business Editor of THE ARCHITECTURAL FORUM.

FIRE PROTECTION ENGINEERING

J. D. HUNTER
Chief Engineer, Marsh & McLennan, Insurance Brokers, New York

Specialist in insurance engineering as applied to building design, construction and equipment.

HOTEL DESIGN AND EQUIPMENT

DANIEL P. RITCHEY

Known in the hotel field as the "hotel doctor." Mr. Ritchey, who is an engineer as well as an experienced hotel owner and manager, is qualified to answer any questions which may arise in this connection.

BUILDING MANAGEMENT

J. CLYDESDALE CUSHMAN
President, Cushman & Wakefield, Inc., Real Estate, New York, Former Secretary, Building Managers and Owners' Association of New York

Mr. Cushman's firm has participated largely in the promotion and operation of many large New York buildings. His specialty is the management of office buildings.

ELECTRICAL SCIENCE

WILLIAM L. GOODWIN
Assistant to the President and in charge of activities of the Society for Electrical Development

This Society is organized to promote accurate knowledge of the practical application of electricity. Its activities extend from the simple problems of household equipment to highly developed electrical plants. Particular attention is given the development of provision for electrical service in buildings.

SAFETY ENGINEERING

S. J. WILLIAMS
Secretary and Chief Engineer, National Safety Council, Chicago

Safety engineering is an important factor in the design of buildings where large groups of people congregate. The National Safety Council has investigated construction and devices with the greatest minuteness.

FARM SCIENCE

FREDERICK WALTER IVES, B.S., M.E.

President, The Agricultural Engineering Company, Columbus, Ohio. Professor and Head of Department of Agricultural Engineering, Ohio State University.

Specialist in land drainage, soil improvement, surveys, farm arrangement for economical production, purchase of equipment and economical layout of farm buildings with special reference to interior arrangement.

THE FORUM DIGEST

A SURVEY OF IMPORTANT CURRENT ARTICLES ON BUILDING ECONOMICS AND BUSINESS CONDITIONS AFFECTING CONSTRUCTION

The Editors of this Department select from a wide range of publications matter of definite interest to Architects which would otherwise be available only through laborious effort

CHARGES AND PROFITS BY THE INTERIOR DECORATOR

AN editorial in *The Upholsterer* (January 15, 1922) offers some interesting information and suggestions on the percentages which must be added by decorators to first costs in order to show a profit. Some of this information may be enlightening to architects:

"There have been in the last few years in New York, four different suits tried in the courts where the complainants were decorators and the defendants were men who had given open orders for decorating and furnishing, and had contested the bills on the charge of exorbitance.

Where a contract for decorating is undertaken at specific prices, this difficulty does not arise, but frequently, if work is undertaken it is practically carte blanche or on a basis of cost-plus-percentage and in such instances trouble frequently results, and the trouble is usually due to a misunderstanding of what constitutes cost.

It is not unreasonable to charge 50 per cent above all costs for a furnishing commission. Some decorators charge more. Some decorators, with reputations, charge for their reputations; and where a client is willing to pay, that is the end of the matter; but if the subject gets into the courts, the courts decide and have decided that a decorator cannot charge a professional fee and a merchandise profit also.

Juries have little consideration for the decorator as a professional man. We have in mind a case that recently came up, very similar to a case that is now pending in the courts and similar to two or three others, where the bill called for 75 or 80 per cent on cost, but in most of these cases the cost was not properly analyzed and did not specify the overhead and expenses. If the cost of executing a commission, for example, is $2,000, the decorator will come out with the small end of the horn if he charges $3,000, because if that decorator is a Fifth avenue decorator, his overhead and expenses are 40 per cent, while on the side street they would be 25 per cent—and his bill *should* carry this 40 per cent overhead and expense charge plus 50 per cent profit charge, or 90 per cent on the cost.

Manufacturers' cost or merchandise cost by no means represents the decorator's cost. He is entitled to remuneration for financing and planning, for skill and reputation, and 50 per cent yields inadequate profit unless overhead and expenses are also added, because they are part of the cost.

It is surprising the amount of trouble and litigation that follows these open or carte blanche orders. When they get to a jury, the decorator discovers that he has got to show overhead and expenses very conclusively to justify 75 or 90 per cent advance on cost.

It is pretty well known that the architect can charge 10 per cent plus his overhead expenses in handling decorating jobs, but these figures are misleading inasmuch as the architect has not invested capital in his business; his overhead expenses are not so great, and his service in financing a job, in carrying stock required, doesn't involve the burden that is borne by the decorator. 75 per cent is little enough to add to the cost of a job involving the risk, the expense, skill and education of a decorator when you consider that even the 5 and 10 cent stores won't handle anything unless it yields 100 per cent.

The decorator, as a rule, is not a good business man, and the Decorators' Society would be doing big work if they would establish some cost system and instil its principles into the minds of the craft at large. This could be only accomplished by heart-to-heart talks, and the society would have to extend its influence to the many instead of the few."

DIVISION OF LABOR COST IN DWELLING CONSTRUCTION

HERE are preliminary figures showing the percentage which the amount paid to each labor group bears to the total labor cost of a 6-room house. These are figures which have been developed by the Division of Building and Housing of the U. S. Department of Commerce. These averages were compiled from reports covering a large number of 6-room brick and frame houses throughout the country.

Total Labor Cost 100 Per Cent

Trade	Frame House	Brick House
Carpenters	49.6	32.2
Bricklayers	6.2	21.5
Hod carriers	2.2	6.7
Plasterers	7.9	8.8
Plumbers	8.7	7.6
Electricians	2.6	2.5
Painters	10.0	6.3
Common Laborers	6.3	9.9
All Others	6.5	4.5
Total	100.4	100.0

FACTORY LIGHTING CODE AVAILABLE

THE code of lighting for factories, mills and other manufacturing buildings, based upon earlier codes issued by the Illuminating Engineering Society, and recently revised by a sectional committee under the sponsorship of this Society, has been officially approved as American Standard by the American Engineering Standards Committee.

The code was first issued by the I. E. S. in 1915 and was revised slightly in 1918. Since June, 1920, the revision of the code has been carried out under the rules of procedure of the American Engineering Standards Committee. In accordance with these rules there was organized for the purpose of revising the code a sectional committee consisting of representatives of these societies and organizations:

American Gas Association.
American Institute of Electrical Engineers.
American Society of Mechanical Engineers.
Association of Edison Illuminating Companies.
Illuminating Engineering Society.
International Association of Industrial Accident Boards and Commissions.
National Association of Cotton Manufacturers.
National Electric Light Association.
National Safety Council.
National Workmen's Compensation Service Bureau (now the National Bureau of Casualty and Surety Underwriters).
U. S. Bureau of Standards.
U. S. Department of Labor.
U. S. Public Health Service.

The code is very brief, consisting of a few rules covering the minimum requirements, from the point of view of safety, for the illumination of traverse spaces during the time of use, methods for the avoidance of glare, and for exit and emergency lighting.

State lighting laws based upon the I. E. S. code have already been put into effect in Pennsylvania, New Jersey, New York, Wisconsin, Oregon, California and Ohio. The adoption of the code is now under consideration in several other states. Copies of this code may be secured from the American Engineering Standards Committee, 29 West 39th street, New York. Price 25 cents.

MAKING CONCESSIONS TO START CONSTRUCTION ACTIVITY

RICHARD SPILLANE, writing in a recent issue of the *Philadelphia Ledger*, gives an interesting account of a practical attempt to bring together bankers, material men, builders, transportation men and labor in order to develop concessions which will result in a large immediate construction program:

"In a large Middle West city an effort has been made to get all these elements together on a stable basis and a set program fair to all and, at the same time, make possible the resumption of construction work. Whose idea it was, is not essential to the narrative. The main facts will do. They may not be exactly as set forth here, but in general they will be correct. Here they are:

"In that city there is in the municipal government a man of exceptional ability. He is quiet, soft voiced, yet determined. He has the confidence of the people and deserves it. Being an engineer, he knows construction work. Being a person of orderly mind, he started out by preparing a table showing the comparative prices of everything entering into the costs of construction work based on the level of 1913, including the maximum in 1920 and the prevailing rate late in 1921. The items in this table included brick, fuel, hauling, gravel, sand, cement, structural steel, reinforcing bars, lumber, paints, varnish, tiles, iron pipe, plumbing materials, electrical equipment, cost of living, wages of building craftsmen, freight rates, etc.

"This chart showed some remarkable irregularities in deflation.

"Then he got together data regarding building projects deferred, owing to high costs. Next he went out and interviewed the persons having charge of those projects and discussed the whole situation with them, the great necessity of restoring confidence, getting the wheels of industry started, etc."

* * *

"The archbishop of that diocese said there were hospitals, parish churches, high schools, etc., which were needed and which would cost about $4,000,000, but which he could not sanction at prevailing prices. The engineer asked the archbishop for a percentage figure on materials and labor at which he would recommend the placing of contracts. The archbishop gave it. "Please put it in writing," the visitor said. The archbishop did so. The Federal Reserve people wanted a new bank building, but were holding off for lower prices. The engineer got a specific statement as to the reduction in material and labor costs that would satisfy them. "Please put that in writing," he said. It was put in writing."

* * *

"It was the same with the head of the Jewish Hospital, the chancellor of a great university, a large textile concern, a big theatrical syndicate, the Scottish Rite Cathedral Association, etc. "Please put that in writing," he said to each, and they put it in writing.

"Then he went to the material people. "Here," he said, "I have pledges for work aggregating $15,000,000 if I can get the costs down. What will you do? Volume makes it possible for you to cut. I have no doubt I can increase this total to $30,000,000, perhaps $35,000,000, if all concerned do their duty." The material men told what they could or would do in the matter of prices over a set period of 6 months or so. "Put that in writing," he said.

"Then he went to the bankers. He got from the foremost financier of the city a guaranteed rate at which he would make loans on building construction, and also a cut in commission charges. "Put that in writing?" he asked. It was put in writing.

"Next he went to the labor leaders. He showed the pledges he had obtained. He showed also that wages in the building crafts in that city were the highest or nearly the highest in America, carpenters, cement finishers, electricians, lathers, bricklayers, pipe-coverers and others getting $1.25 an hour and plasterers and hoisting engineers $1.37½ an hour. He suggested a cut of 20 per cent. The labor leaders refused. They would agree to 7½ per cent, they said, but no more.

"The mild voiced gentleman said he would go beyond them and appeal to Labor itself. Thereupon he prepared his case, put all the facts in simple form and asked Labor to vote "yes" or "no" on the question of accepting a 20 per cent reduction.

"But he went further. He journeyed to Washington and saw the high officials of the American Federation of Labor. They declared the local labor leaders who refused to co-operate with him fully were misrepresentative of Labor. "We'll tell them they are acting like fools," they promised. "We'll do all we can to make them see they are wrong in their position. We'll help you."

"Now it's up to Labor in that Middle West city to decide by its vote.

"What has been done in that city can be done in every city in America if the right man takes hold in each instance. It's a one-man job. Properly handled, it means not only a decided step toward building resumption now, but a better understanding of the whole subject in the future."

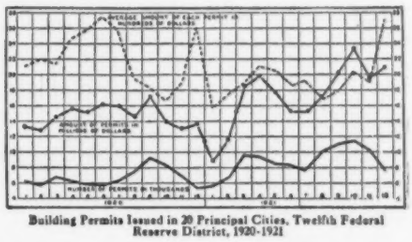
In this connection it is interesting to note that a movement is now on the way in New York to bring about the immediate construction of $100,000,000 worth of housing of the tenement class. Builders and material men have already agreed to cut prices and profits to make this project possible, and financial interests have indicated their willingness to provide the necessary financing, if the project can be developed to meet their investment requirements. It is expected also that a considerable cut in labor cost will be contributed by organized labor to this movement. The outcome of such co-operative efforts to meet the construction situation is awaited with keen interest.

BUILDING ACTIVE ON PACIFIC COAST

THE Federal Reserve Bank of San Francisco reports that in its district, building activity for December reached the second highest point ever touched, being exceeded only by the returns for the month of October, 1921.

The accompanying chart shows the number, total valuation and average value of building permits issued in that district since January, 1920.

A study of the trends shows that much of the November and December activity in 1921 took the form of larger projects. This fact is shown by a sharp rise in the curve indicating average amount of each permit in hundreds of dollars, an increase in the amount of investment and a sharp drop in the actual number of permits issued.



Building Permits Issued in 20 Principal Cities, Twelfth Federal Reserve District, 1920-1921

FORBES PREDICTS BUILDING BOOM

IN the February 4 issue of *Forbes' Magazine*, B. C. Forbes, the well known economist, makes this forecast which should be of considerable interest to the building fraternity:

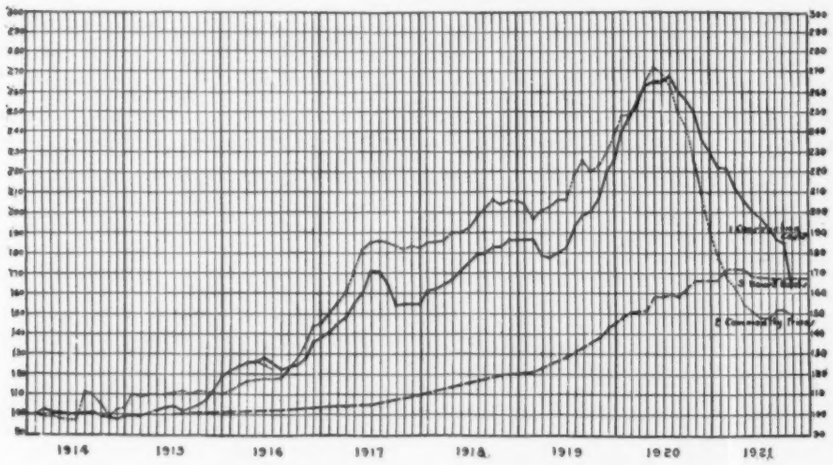
"There is almost certain to develop a pronounced revival of building. That very large sums will become available for dependable prospective builders in the spring can be taken for granted. Announcement has been made that one of the largest insurance companies is ready to provide $100,000,000 to finance the erection of apartments for the working classes in New York, where the need for additional accommodations is urgent and special legislation allows valuable tax-exemption privileges. In view of the growing plentifulness of money at moderate rates, there may easily be enough building by private interests to offset the rather clamorous demand here and there that public funds be made available for providing housing facilities."

REACHING STABLE ECONOMIC LEVELS

IN presenting the accompanying charts in *The Constructor* for January, John R. Wiggins, President of John R. Wiggins, Inc., of Philadelphia, makes several interesting and constructive comments. He says in part:

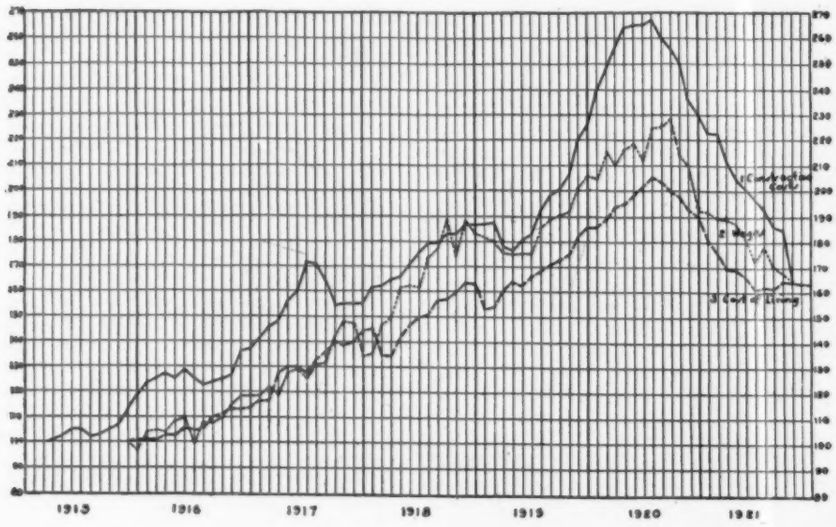
"The construction industry of the United States has just passed through two extremely uncertain, and to a large extent lean, years. The year 1922 ought to be hailed with satisfaction by those engaged in the industry because of the fact that it

holds promise of laying low the uncertainty which has stalked our paths for the past two years particularly, and in varying degree for the last seven years. The ending of this period of freaky markets and sporadic demand points the way to a substantial resumption of activity throughout the industry.



Comparative Trend of Construction Costs, Commodity Prices and House Rents

1. Construction Costs—Composite of a weighted average of the wholesale prices of 15 principal building materials and a weighted average of wage rates in the principal building trades. The prices used are those in effect on the first day of each month. (Solid line.)
2. Commodity Prices—Based on U. S. Department of Labor's compilation of wholesale prices of all commodities. The prices used are those in effect on the first day of each month. (Dotted line.)
3. House Rents—Based on statistics of approximate changes in rents of houses of wage earners' families in cities throughout the country, as compiled by the National Industrial Conference Board. Figures used for rents in effect on the 15th day of each month. (Broken line.)



Comparative Trend of Construction Costs, Wages and Cost of Living

1. Construction Costs—Composite of a weighted average of the wholesale prices of 15 principal building materials and a weighted average of wage rates in the principal building trades. The prices used are those in effect on the first day of each month. (Solid line.)
2. Wages—Based on compilations of the U. S. Bureau of Labor Statistics, showing payroll statistics reported by over 600 establishments with normally about 600,000 employes. (Dotted line.)
3. Cost of Living—Based on statistics of the approximate changes in cost of living of wage earners' families compiled by U. S. Bureau of Labor Statistics. Represents approximate conditions on the 15th day of each month. (Broken line.)

A glance at the charts shown here drives home one great lesson; namely, that, whereas during the years of, and immediately following, the war great abnormal peaks appeared and much divergence in the cost bases of the various commodities and materials existed, these lines now are approaching, and have practically reached a mean level, higher than 1914 it is true, but evidently constituting a new normal on which business may be soundly transacted. This new normal, probably in the general neighborhood of 60 per cent higher than in 1914, will likely gradually recede during the next decade or more, and there will undoubtedly be frequent fluctuations during that period. While, as just said, the level of construction costs will probably recede for 10 or more years, this recession will not be sufficiently great to pay prospective owners to postpone contemplated projects in anticipation of this reduction of costs. In fact, the price level today is economically sound and it will pay owners to proceed with construction.

Reaction from Stagnated Costs Probable

The first fluctuation to have much bearing on our particular business and field will be made up of the probable rise in the cost of construction during the middle third of 1922. The reaction caused by the change from a period of largely stagnated construction activity to a time of more substantial business will undoubtedly cause some rise in the market. It is to be hoped that general conditions affecting the release of much of the construction work now under contemplation will be such as to prevent a too suddenly increased demand, and thereby avoid the danger of a pyramiding of prices and the consequent runaway market. Should this pyramiding develop, it can mean only one thing; namely, another long period during which the public will not have confidence in the industry, and we shall have to fight all over again the battles so dearly won during the past two years. This vision of another period of readjustment, I hope and believe, will not materialize, because the 1922 resumption of construction activity, in all probability, will be sufficiently gradual to prevent more than a slight advance in price.

Finance

The difficulties which have been experienced since the war in financing construction projects are well on their way toward being smoothed out. This is certainly true to my personal knowledge with regard to large building projects in the great Eastern cities, in particular with reference to large apartment, hotel and office structures. Whereas a year ago money was almost absolutely not available for these purposes, now it can be had in increasingly large amounts and at decreasing financing costs. I believe the new year will see funds available in amounts adequate for necessary construction and at non-prohibitive rates.

SERVICE SECTION
of THE ARCHITECTURAL FORUM

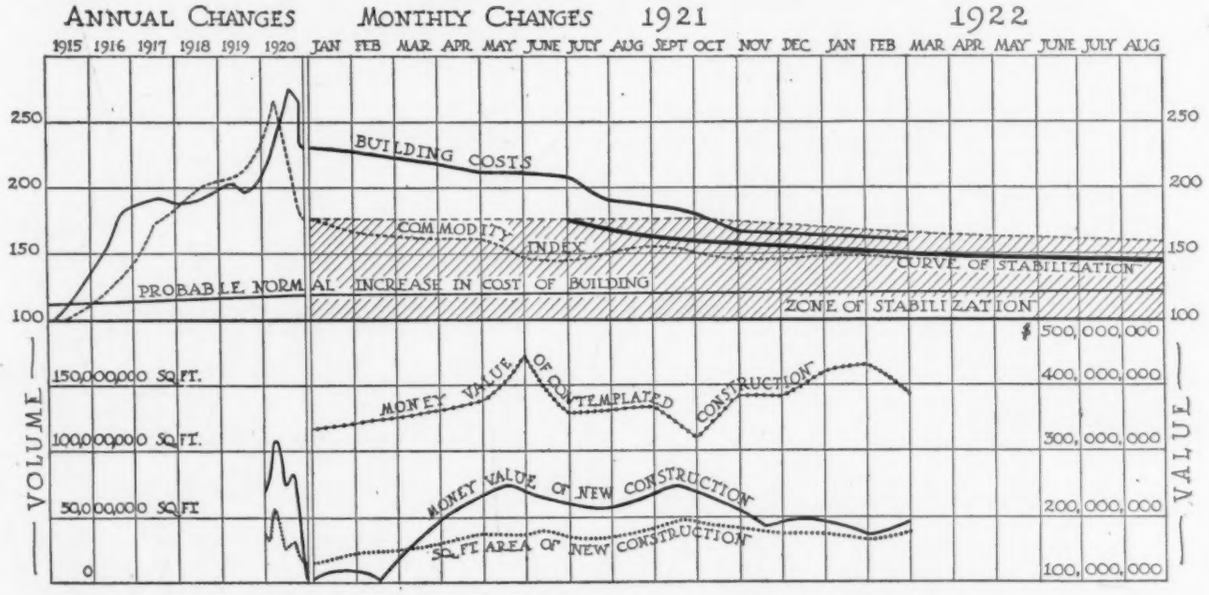
Information on economic aspects of construction and direct service for architects on subjects allied to building, through members of THE FORUM Consultation Committee

The Building Situation

THE volume of plans filed for new construction during the first two months of 1922 shows a great increase over a similar period for 1921. While there has been a seasonal drop in the actual volume of contracts let during this period, it will be noted that the upturn for 1922 had already begun in February and that the total volume of construction in 1922 bids fair to exceed that of 1921 by a large percentage.

The trend of building costs is still slightly downward, due principally to another drop in cement, steel and labor costs. In analyzing the chart below it will be noted that the index of building costs is following closely the curve of stabilization as established by THE ARCHITECTURAL FORUM early last year. This means that the confidence of building investors is mounting rapidly because they are learning that we have really entered the period of stabilization in building costs and that there is no danger of too great a depreciation in the replacement value of buildings constructed now.

Within the past few weeks there has developed in many architectural offices an optimistic outlook as to the near future in the building industry. Already a number of projects which have been held up for many months are proceeding from the stage of sketch plans into that of actual working drawings and specifications, ready for the letting of contracts. The outlook for financing of new buildings is becoming brighter every month. Most of the large loaning institutions have funds available for building and permanent mortgage loans, and a return of public confidence in mortgage bond investments is reported generally. All basic trends point to a period of prosperity in the building construction industry. The confidence of prospective investors is being rapidly reestablished; labor is settling down to a sound basis of production; the flow of money into building channels is increasing, and contractors are now able to figure with a fair degree of accuracy. Architects have reason to expect a developing volume of business.

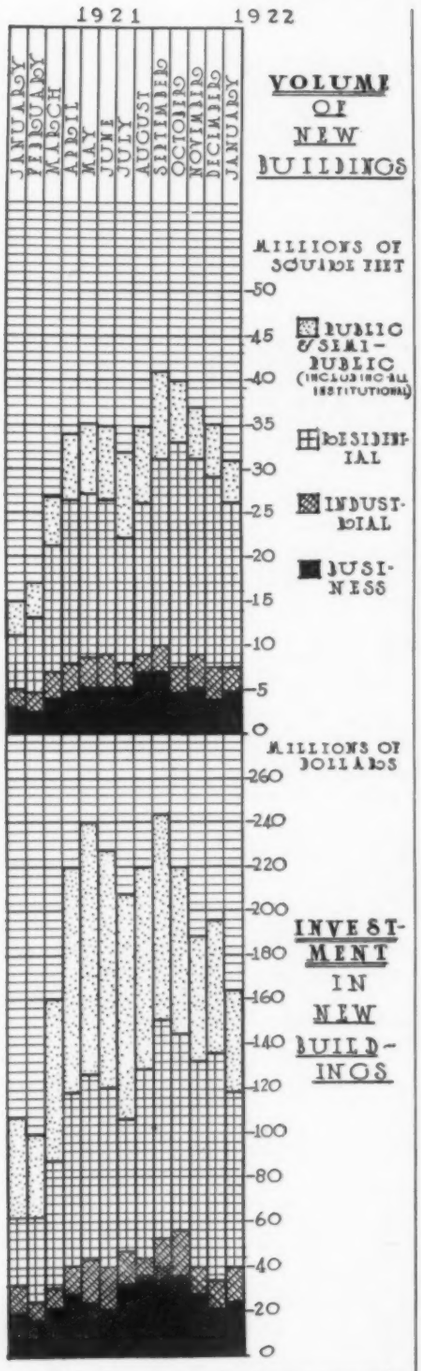


THIS chart is presented monthly with trend lines extended to the most recent date of available information. Its purpose is to show actual changes in the cost of building construction and the effect upon new building volume and investment as the *index line of building cost* approaches or recedes from the "curve of stabilization."

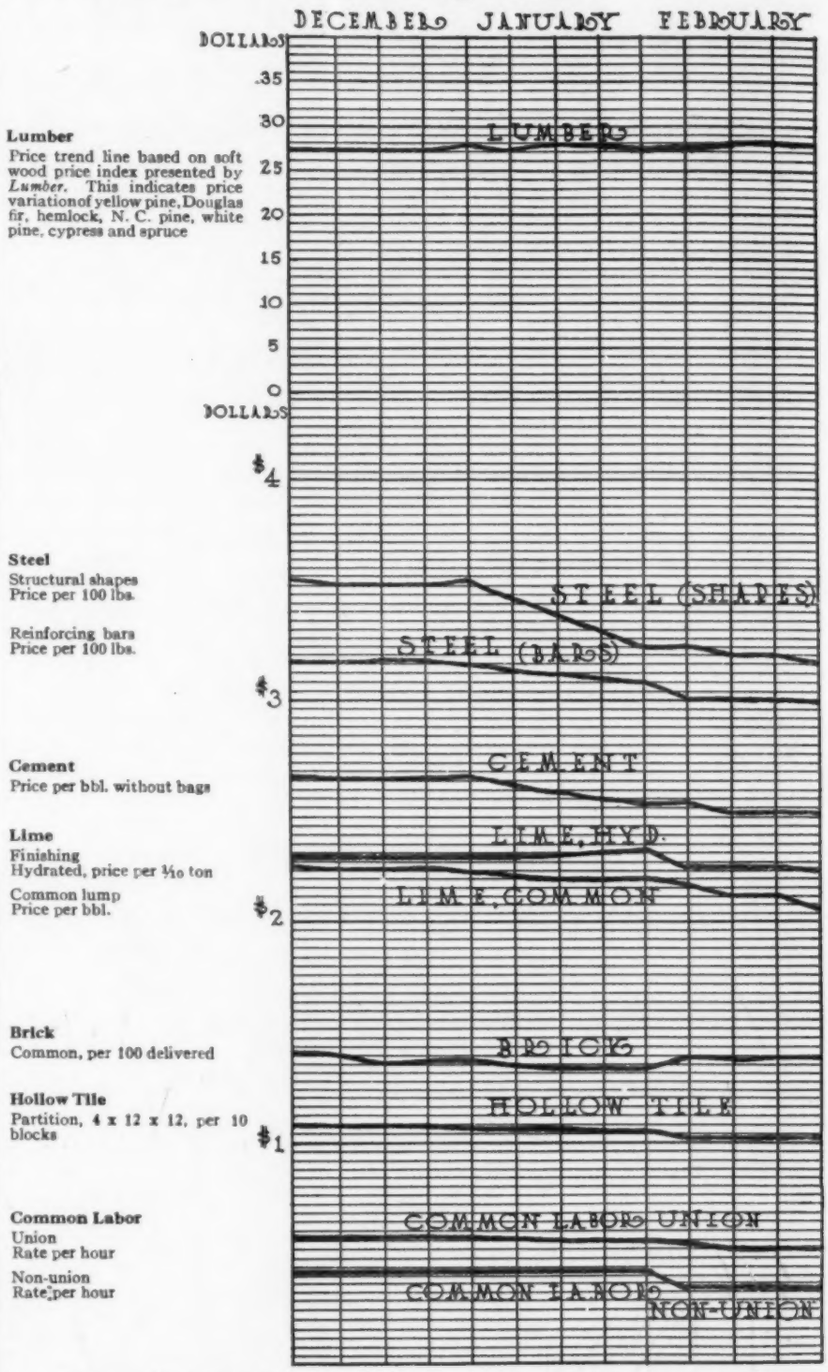
The CURVE OF STABILIZATION represents the building cost line at which investors in this field may be expected to build without fear of too great shrinkage in the reproduction value or income value of new buildings. The index line representing actual cost of building entered the ZONE OF STABILIZATION in the fall of 1921. If this cost line passes *out* of the zone of stabilization, building volume will decrease materially.

The degree of the curve of stabilization is based on (a) an analysis of time involved in return to normal conditions after the civil war and that of 1812; (b) the effect of economic control exercised by the Federal Reserve Bank in accelerating this return after the recent war, and (c) an estimate of the probable normal increase in building cost.

Factors of Fluctuation in Building Costs



Analysis of new construction showing comparative importance of major building types in volume and investment.



Figures used in developing all trend lines represent average prices to contractors in following cities: New York, Chicago, Denver, Seattle, Minneapolis, Atlanta, Dallas and San Francisco

THE chart at the left shows in square feet and in dollars the volume of new building construction since January, 1921. It will be noted that the volume for each month is divided into four building types. This makes possible a comparison of the amount of money spent in each of these divisions of the building field in relation to the volume of new buildings developed. It is interesting to note that while the area of new construction in public and semi-public buildings is much smaller than in the residential types, the amount of money expended is almost as great. This indicates a comparative value of the costs per square foot.

The cost trend of the material market is still slightly downward. It will be noted in the chart at the right that there has been a slight decrease in the cost of steel, cement and labor. Negotiations are now under way between some of the railroad interests and lumber producers to see if it is not possible to develop a simultaneous reduction of lumber prices and freight rates. It is to be hoped that these negotiations will prove successful.

Manufacturers who have recently cut prices have been surprised at the strength of the buying movement which lies just under the surface. It is to be noted that the lines indicating labor cost would have a sharper downward trend if we could introduce the element of increased production on the part of building trades labor as outlined in the March issue.

BUILDING MATERIAL PRICES

Table Showing Average Prices Paid by Contractors for Building Materials at Local Distributing Points as of Feb. 1, 1922. Prepared by Division of Building and Housing of the Department of Commerce from Prices Secured through the Bureau of Census

Commodity	Size or Condition	Unit	Mass. Haverhill	Mass. Fitchburg	N. Y. Buffalo	Penn. Pittsburgh	Penn. Erie	Md. Baltimore	W. Va. Fairmont	S. C. Columbia	Mich. Detroit	Mich. Saginaw	Wis. Milwaukee	Ia. Cedar Rapids	Ia. Waterloo	Ia. Des Moines	Ill. Chicago	Ill. Rock Island	Missouri Kansas City	Missouri St. Joseph
Common Brick		1,000	$20.00	$18.00	$17.12	$16.00	$15.75	$12.50	$21.12	$10.50	$16.50	$12.00	*$13.00	$14.00	$15.40	$18.00	$11.00	*$13.90	$16.50	$18.00
Portland Cement	Excl. of containers	Bbl	.....	2.57	2.36	2.02	3.00	2.50	2.20	2.90	2.85	2.23	*2.30	2.26	2.33	2.56	1.87	*2.35	2.80	3.00
Yellow Pine No. 1	Dimension 2x4-16' S1S1E	M	60.00	53.00	32.00	45.00	.....	47.50	33.50	.....	40.50	45.00	35.00	.....	38.00	42.00	41.00	47.50	38.50	42.00
Douglas Fir No. 1	Dimension 2x4-16' S1S1E	M	.....	.....	.....	.....	.....	.....	.....	.....	40.50	47.00	38.00	40.00	38.00	49.00	.....	.....	34.00	.....
N. Carolina Pine No. 1	Dimension 2x4-16' S1S1E	M	.....	33.00	.....	.....	.....	35.00	.....	17.00	40.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
Common Boards No. 1	1x6	M	40.00	45.00	29.50	43.00	.....	35.00	33.50	20.00	.....	37.50	33.00	35.00	34.50	39.00	36.00	57.00	43.00	38.00
Y. P. Flooring E.G."C"	1x4-10'-16'	M	57.00	69.50	.....	68.00	.....	50.00	60.00	.....	.....	60.00	.....	86.00	94.00	.....	.....	80.00	75.00	75.00
Douglas Fir V.G. No. 2	1x4-10'-16'	M	.....	.....	.....	.....	.....	.....	.....	.....	67.50	63.00	.....	90.00	94.00	88.00	.....	100.00	.....	.....
Red Cedar Shingles	Extra clear 16" 5 to 2	100 sq. ft.	6.00	7.50	5.70	5.25	5.50	.....	4.80	5.00	4.53	5.00	.....	6.00	7.50	6.35	.....	5.75	5.00	6.50
Cypress Shingles	Extra clear 16" 5 to 2	100 sq. ft.	.....	8.50	.....	.....	7.00	.....	.....	4.50	.....	.....	5.00	.....	9.00	.....	.....	.....	6.00	.....
Composition Shingles	Crushed slate surfaced	100 sq. ft.	6.00	6.25	.....	.....	7.00	5.75	4.30	5.85	.....	6.50	6.00	5.75	8.00	6.30	.....	8.00	5.80	.....
Gypsum Plaster Board	½"	1,000 sq. ft.	46.00	60.00	45.00	.....	50.00	37.50	25.05	32.00	30.00	45.00	32.50	35.00	25.00	37.50	.....	55.00	32.50	33.00
Lime	Hyd. Com.	Ton	20.00	18.50	18.00	14.30	19.00	15.00	13.19	19.00	15.20	17.00	15.00	16.00	25.60	28.00	14.70	*20.00	24.00	28.40
Building Sand		Cu. yd.	2.50	1.60	.95	1.55	2.50	.95	3.50	.95	2.50	2.45	1.50	.90	1.50	1.80	2.50	*2.25	2.35	1.08
Crushed Stone	¾"	Cu. yd.	3.00	3.38	1.30	2.75	3.00	2.30	4.60	3.25	3.50	2.75	2.50	2.03	3.00	3.00	2.13	*3.25	3.00	2.75
Window Glass	Single A 10"x12"	50 sq. ft.	3.60	5.40	3.90	2.80	.....	4.50	4.20	4.09	3.60	5.40	.....	.....	7.00	6.00	.....	.....	4.50	4.80
Hollow Tile	8"x12"x12"	Each	.26	.20	.19	.15	.18	.17	.16	.14	.....	.16	.15	.12	.12	.14		*.13	.22	.....
Cast Iron Pipe	4" E.H. 13 lbs. per ft.	Ton	.....	.....	58.80	47.50	.....	.....	41.50	.....	53.00	50.00	.....	.....	45.00	52.30	.....	.....	.....	50.00
Steel Pipe	1" galv.	100 ft.	10.00	.....	10.00	7.82	.....	.....	7.60	9.00	.....	10.00	.....	9.61	9.59	10.00	.....	.....	.....	9.84
Reinforcement Bars	¾" square	100 lbs.	2.40	2.50	1.79	1.55	.....	2.50	2.00	3.20	2.60	2.85	*2.60	2.75	2.10	2.75	.....	2.35	2.90	3.00
Structural Steel	Fab. 6" I-beams	100 lbs.	4.00	5.00	2.65	1.65	.....	2.60	3.25	3.50	3.50	3.00	3.50	4.00	3.20	3.35	.....	.....	3.75	.....
Gypsum Plaster	Neat	Ton	22.00	20.00	13.50	13.40	24.00	.....	14.90	16.90	19.00	15.00	26.00	14.20	13.60	17.50	.....	*17.00	15.50	17.50
Roofing Slate	No. 1 Ribbon	100 sq. ft.	.....	15.50	8.00	10.50	.....	.....	10.25	12.00	.....	.....	.....	.....	22.00	.....	.....	.....	.....	.....
Tar Paper, Roofing	2-ply 75 lbs. per roll of	100 sq. ft.	2.25	3.50	2.00	1.95	2.15	.....	.....	2.15	.....	2.75	.....	1.10	2.45	3.00	.....	1.90	.....	2.44
Rosin Sized Sheathing	3-ply 30 lbs. per roll of	500 sq. ft.	1.50	2.00	1.00	1.35	.85	.75	.90	1.00	.....	.....	.....	1.10	1.47	1.20	.....	1.30	1.20	.....

*F.O.B. job

Commodity	Size or Condition	Unit	Mo. St. Louis	Ohio Akron	Ohio Warren	Ohio Cincinnati	Ohio Toledo	Ohio Dayton	Ky. Louisville	Ark. Little Rock	La. Shreveport	La. New Orleans	Tex. San Antonio	Wash. Tacoma	Wash. Seattle	S. D. Sioux Falls	Calif. San Francisco	Calif. San Diego	Calif. Pasadena	Ariz. Tucson
Common Brick		1,000	.....	$13.50	$18.00	.....	.....	*$17.50	$15.00	$12.50	*$15.00	$12.25	$16.00	$16.00	$15.00	$18.00	$15.50	$20.00	*$17.00	$17.00
Portland Cement	Excl. of containers	Bbl.	*$2.70	2.53	2.85	$2.40	$2.98	*$3.32	2.38	3.75	*3.80	2.60	3.30	3.35	3.54	2.50	2.55	4.00	*3.30	4.40
Yellow Pine No. 1	Dimension 2x4-16' S1S1E	M	*39.00	37.00	48.00	36.50	41.00	*45.00	42.50	30.00	*39.00	.....	45.00	.....	.....	.....	.....	.....	.....	.....
Douglas Fir No. 1	Dimension 2x4-16' S1S1E	M	*39.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14.00	18.00	38.00	31.00	40.00	*48.00	50.00
N. Carolina Pine No. 1	Dimension 2x4-16' S1S1E	M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Common Boards No. 1	1x6	M	*43.00	38.00	45.00	50.00	60.00	*40.00	57.50	32.00	*41.00	.....	48.00	14.00	16.00	38.00	32.00	.....	*46.00	.....
Y. P. Flooring E.G."C"	1x4-10'-16'	M	*59.00	65.00	80.00	61.00	.....	.....	66.50	45.00	*68.00	.....	75.00	.....	.....	.....	.....	.....	.....	95.00
Douglas Fir V.G. No. 2	1x4-10'-16'	M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	65.00	57.00	81.00	68.00	.....	*85.00	.....
Red Cedar Shingles	Extra clear 16" 5 to 2	100 sq. ft.	6.25	6.50	5.30	5.00	5.04	*5.40	6.20	4.75	*6.30	.....	7.00	4.50	3.75	5.40	5.40	.....	*6.50	5.50
Cypress Shingles	Extra clear 16" 5 to 2	100 sq. ft.	.....	.....	.....	.....	.....	.....	.....	4.50	*7.65	.....	9.50	.....	.....	.....	.....	6.00	.....	.....
Composition Shingles	Crushed slate surfaced	100 sq. ft.	5.90	.....	8.50	5.75	6.75	*6.50	6.00	6.50	*8.00	6.50	.....	.....	7.50	8.00	.....	.....	.....	.....
Gypsum Plaster Board	⅜"	1,000 sq. ft.	45.00	47.50	40.00	.....	45.00	*37.50	38.00	35.00	*50.00	50.00	52.00	40.00	42.50	45.00	42.22	39.00	*44.40	65.00
Lime	Hyd. Com.	Ton	20.00	17.00	18.00	12.00	.....	*14.00	.....	24.00	*24.00	13.25	22.50	23.00	24.00	20.00	22.00	28.00	*32.00	16.50
Building Sand		Cu. yd.	2.63	1.65	3.00	1.40	*2.25	*1.85	.....	1.00	*2.25	1.35	2.75	1.25	1.50	.....	1.50	3.00	*2.00	1.10
Crushed Stone	¾"	Cu. yd.	.....	3.25	3.00	1.90	*3.00	*2.30	.....	2.00	*5.25	2.25	2.60	1.50	.....	.....	2.50	3.40	*3.75	3.00
Window Glass	Single A 10'x12"	50 sq. ft.	.....	4.50	.....	.....	.....	*5.00	.....	5.00	*4.50	.....	5.40	7.50	3.55	.....	4.65	6.20	.....	7.80
Hollow Tile	9"x12"x12"	Each	.16	.12	.17	.....	.....	*.19	.....	.20	*.21	.....	.21	.25	.22	.14	.18	.22	.....	.18
Cast Iron Pipe	4" E.H. 13 lbs. per ft.	Ton	.....	.....	49.00	.....	.....	*60.00	.....	65.00	*77.00	.....	59.00	.....	75.00	.....	49.23	.....	.....	67.50
Steel Pipe	1" galv.	100 ft.	.....	8.36	8.70	.....	.....	*9.50	.....	11.00	*9.43	.....	9.40	13.70	10.25	.....	8.00	.....	.....	11.00
Reinforcement Bars	¾" square	100 lbs.	2.75	2.75	2.30	.....	.....	*3.00	2.67	3.25	*3.60	.....	3.75	4.25	3.50	2.80	3.00	4.50	.....	5.00
Structural Steel	Fab. 6" I-beams	100 lbs.	.....	2.75	3.00	.....	.....	*4.00	2.30	3.50	*4.00	.....	.....	5.50	5.90	3.20	3.75	.....	.....	.....
Gypsum Plaster	Neat	Ton	19.50	19.00	19.00	.....	.....	.....	.....	27.00	*24.00	20.00	24.00	21.50	21.00	.....	16.93	24.00	*20.00	.....
Roofing Slate	No. 1 Ribbon	100 sq. ft.	.....	11.50	.....	.....	.....	.....	.....	16.00	*12.00	.....	.....	17.00	.....	.....	.....	.....	.....	.....
Tar Paper, Roofing	2-ply 75 lbs. per roll of	100 sq. ft.	.....	1.40	2.50	.....	.....	*2.50	.....	2.25	*2.50	.....	.....	2.10	3.00	3.50	2.50	3.25	*2.55	3.75
Rosin Sized Sheathing	3-ply 30 lbs. per roll of	500 sq. ft.	.....	.....	.....	.....	.....	*1.25	.....	1.25	*1.25	.....	.....	.77	.75	2.00	2.00	.....	.....	1.50

*F.O.B. job

Banker's Analysis Promises Construction Activity

EXTRACTS FROM ADDRESS BY LEONARD P. AYRES, VICE-PRESIDENT CLEVELAND TRUST COMPANY

THE recovery of the construction industry is the first, most potent and perhaps the most important sign of a recovery from a period of depression. Such a recovery has begun to take place now, and we watch it with the very closest scrutiny because we are enormously interested, more than we would be in the same amount of recovery in any other industry.

I have tried to find out how much recovery in construction is occurring. Each one of those black, upright columns on this chart (Fig. 1) represents in millions of dollars the amount of building permits in the 20 leading American cities each year over the past 21 years. They are rather low in the period of hard times, the panic of 1903–1904. They come up sharply in the period of prosperity that followed. They fell off again in the period of 1907–1908, responded again to the prosperity of 1909 and the steady prosperity of 1910, 1911 and 1912, going down again in the hard times of 1913 and 1914, and then recovered.

Here on the chart (Fig. 1) are some columns partly solid, partly in outline. The first prominent one is for the year 1916 and a lower one, 1917, and a very little one, 1918. An enormous recovery is shown in 1919, a bad period in 1920, and a very great amount of money spent on construction in 1921. These last columns, partly solid and partly in outline, represent in their entire height the total amount of money spent. That building, however, was very expensive building and the money spent did not measure the amount of building actually done in the same sense that it did in earlier years, so I divided through by the increased cost of that construction each

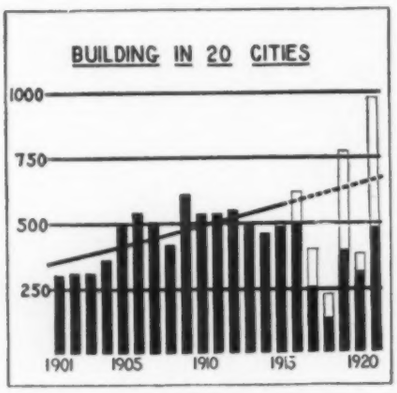


Fig. 1. Comparison of Volume of New Construction

year and it shrinks these columns down to the part that is in black. The black portions show, on the same basis as for the earlier years, how much construction was actually done.

Then I said, "Now let's find out how this business of construction in our cities is growing from year to year." So I had drawn through this diagram, from the starting point at the left over to 1915, the slanting straight line. That represents (over the first part of the period) the general trend of construction that was increasing as these cities grew in population. It is not drawn through by guesswork or by pulling a string across the upright columns or by any such method, but by the method of fewest squares, which gives us a line that a mathematician would describe as representing more accurately than could any other straight line that might be drawn the general trend of these irregularly rising columns. I continued it on up over the last abnormal period, and we can fairly say that it is the normal line.

THESE extracts from the address of the Vice-president of the Cleveland Trust Company before the Associated General Contractors constitute an unusually able analysis of present conditions in the building industry and indicate a period of extraordinary activity. The encouraging predictions of a banker and well known economist are of special value in demonstrating that a practical period of stabilized building conditions has been reached.

We may say that in these first four bad years building was below normal. Then it shot up very much above normal and made up the deficiency. In the hard times of 1908 it fell below normal, and then again it shot up and stayed up considerably above. It went down in 1913 and 1914 and was coming up when the war came on; then we have this irregular process further on. Building responds very sensitively to these changes in business conditions. It is very depressed or it is very active. The construction industry is either abnormal or sub-normal, and on the chart you see it swinging from one stage into the other, and so if we have our normal line as we have shown on the chart, we may measure the degree of variation and find out how great is the shortage or how much ahead of the natural, normal requirements in the community the thing is.

I may say I doubted a bit whether this was fully reliable, and made the same computation from the Bradstreet figures, covering 120 cities instead of 20 cities, and within a few fractional points it checked out. So I took the straight slanting line and I made it into a horizontal line right across this chart (Fig. 2) and put below the deficiencies and above the surpluses and above normal by quarters instead of by whole years. Twenty, in 1902, means 20 per cent below normal in that year, 30 per cent below in 1903 and so on. Twenty in 1905–6 means 20 per cent above normal, and the horizontal line is simply that slanting straight line on the other sheet that I have turned around until it is level.

So here we have the story of the construction industry in these 20 leading American cities, a deficiency of building in 1901 and 1902 and 1903 and 1904, a very quick recovery catching up with the deficiency and going ahead, and activities above normal in 1905 and 1906 and the first part of 1907, the panic of 1907–1908, almost a stoppage of construction, a quick recovery and back to the prosperity of 1909. Then several years, you remember them well, when we didn't have very prosperous times, and we didn't have any more panics or depressions, and construction, like other business, went along fluctuating above and below normal over quite a span of time.

Then we came into this period of restricted building that came with the great war. The government came into it and down, down it went until we get down to 1918, almost to a suspension of city building, where at the low point we were about 96 per cent or 98 per cent below normal, down almost to nothing. A brief recovery in 1919, and a very great depression again in 1920, and then the rapid recovery which has carried us up to about 11 per cent above normal on the basis of the last data that has come in. So we have here a mirror showing how construc-

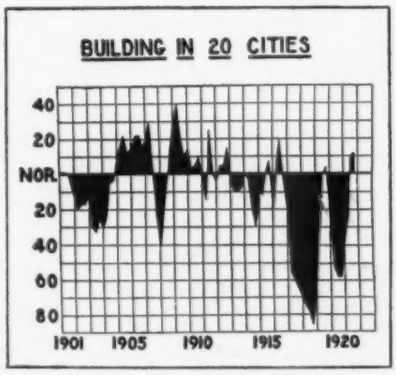


Fig. 2. Comparison of Construction Volume with Respect to Normal

tion has been fluctuating over a quarter of a century. I took those figures and said, "How far ahead or behind the game are we?" Because that is the answer that I was trying to get at—to see how the sizeup of this industry would turn out. And here (Fig. 3) I have a curved line showing the accumulated results.

If you put all these deficiencies together and then add the surpluses and subtract deficiencies again, what happens? We were even with the game when we started. We ran into those hard times of 1901 to 1904 and accumulated a deficiency of building in 20 cities amounting to more than one-half year's construction. Prosperity came and we cut down that shortage and we got it down almost to normal when the panic of 1907–1908 came along, restricted the building and the shortage came up again. In 1909

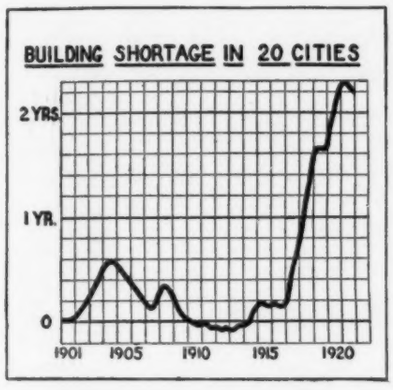


Fig. 3. Building Shortage Expressed in Terms of Annual Construction

construction went ahead rapidly; the shortage was cut down until we got to normal and ahead of it and began to get a little overbuilt, and many of you can remember those years in which our city buildings were hunting for tenants. It ran along up to 1914, until in 1915 and 1916 a little shortage developed, and then 1917, 1918, 1919 and 1920, one year, two years, two and a quarter, well along toward two and a half years of shortage of building in our American cities, and I think that it will turn out to be about that figure, whether you measure it by these 20 cities or whether you take 120 cities.

It is not true for the country districts, insofar as I can find out, but in city buildings that in general is the condition, and we have turned the corner and started to cut the deficiency down with the active building operations of the last few months.

Let us assume that that series of computations is roughly right, and I think we may do that. What does it mean? It means that this industry, if it has ahead of it a shortage amounting to two and a quarter years of construction, is in a condition where, if we have anything resembling normal business, it can go ahead for nine years at 25 per cent above normal for the whole time.

It is not going to do that, for various other reasons, but that shortage is there. Most of it is a shortage that has to be made up—not all, because in some measure, if you use a building longer than you normally would use it, that deficiency does not have to be made up. The suit of clothes that I have on has done a year's more service than normal and I will never have to make it up; I have saved that year. But that is not equally true of buildings, for populations grow and they require more and more buildings and this normal is a very real thing. If we grow with that rapidity, it happens to our clothes, too, by the way. No other industry has any such condition confronting it. The fact constitutes an opportunity that ought, if properly managed, to turn out to be one very nearly unparalleled in our current economic situation.

Why does business recover after a depression? In these business cycles that I have talked about, several things always happen in order. When we are at the height of prosperity, running along with great profits and enormous activity, the first warning we get that such a condition is coming to an end is a break in the stock market. It always happens. About 6 months after that break, we get a break in commodity prices. About 6 months after that we get one in interest rates.

If you take the last five serious depressions in this country and go through their history, you find those three things happening in that order at almost identically that time spacing. All of them have happened this time. They have happened in that order, and the interest rates are now well down and still dropping. When they drop far enough, business men begin to see that once more they can resume business at a profit. Those who are enterprising and daring have in the past in that last stage of depression started to extend their factories or to build new ones, which is what has brought about the recurrence of construction activity in the latter part of a depression. That is why economic students, bankers and financial writers always watch for that upturn in building because they know that what it means is that money has at last become cheap enough so that progressive and enterprising business men are once more starting to build. It becomes a barometer of business.

This time the recovery of building is not of that sort. It is not typical. Watching it, as we do with greatest care, we must not let ourselves be deceived into thinking that it is that sort of enterprising business and industrial construction that has characterized the recovery from every previous depression in this country. It is not; it is something different. During these past half-dozen years of abnormal activity and great prosperity in this country we have as a nation given our effort and our attention to that type of construction that related to producing things, manufacturing things and storing, and we have neglected those things that relate to the comfort and the welfare of people, and our great shortage has grown up in that latter kind of building. And now when we return to construction activity, we find that activity is sluggish in those things that relate to the manufacture and storage of things and that it is active and stimulated in that kind of building that has to do with the comfort, the shelter and the welfare of the people.

And so we can take what happened in 1920 from the Dodge figures of what happened in 1921, and we will find these facts standing out, and we shall find, taking the money out of it by talking about square feet this time, a situation such as is shown in Fig. 4. Each pair of bars is a comparison of the amount of construction done in 1921 with that done in 1920, for one particular class of buildings. The upper bar of each pair corresponds to 1921, the lower to 1920.

The residence building this year in millions of square feet is 183 as against only 132 last year, an increase there of almost 50 per cent. Business buildings have shrunk. School building is active and getting more active. The proportion is

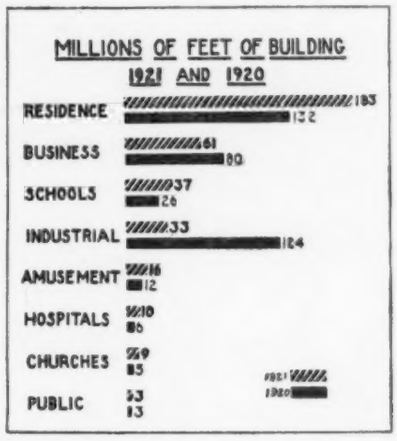


Fig. 4. Comparison of Volume in Building Types for Last Two Years

rising and there is an enormous shortage of school buildings. Industrial construction, which in 1920 amounted to 124 million, is down to roughly one-quarter of that amount in 1921. That sluggishness still continues, and will for some time to come, in most parts of the country. Amusements, which largely mean movie theaters, are 33 per cent ahead of last year. Hospitals are well along toward double. Churches also well along toward double. Public buildings are the same as in 1920.

So we have these buildings that have to do with business and industry, sluggish; but residences, schools, theaters, recreation halls, hospitals, churches, public buildings, catching up with the deficiency. Of course business recovers, as it has already started to do, gradually, and I think it will be a long, slow and irregular recovery.

So I should say, in concluding, that *the outlook for the construction industry is one of a most extraordinary sort and an outlook that has an exceptional promise for good business on a falling market.* When I say on a falling market, I mean a market of falling prices for general business.

The construction industry thus enters a period of great accumulated shortage at a time when interest rates have fallen far, far below what they were and when the difficulties and problems of financing are rapidly disappearing—so rapidly that my own expectation is that within 6 months most of the acrimonious discussions that you and we have indulged in will be at an end. Thus I think the problems of financing are largely ended, because money is easy and seeking investment, prices have come down to a relative stability, and a shortage exists.

THE FORUM CONSULTATION COMMITTEE

A group of nationally known experts on various technical subjects allied to building, providing a direct service to architects

THE editors of THE ARCHITECTURAL FORUM have been fortunate in obtaining the co-operation of the following recognized experts who constitute THE FORUM Consultation Committee. This Committee provides a service of the greatest value to subscribers in addition to the usual editorial service, and architects who seek information on specific questions in these various fields are invited to present inquiries.

The basis on which this Committee has been organized is:

(*a*) That each Committee member shall be a representative leader in his line;
(*b*) That no Committee member has affiliations with any manufacturer;
(*c*) That no Committee member will be called upon for detailed service except by special arrangement;
(*d*) That a special editorial article on a subject represented under each of the headings below shall be prepared during the year by the Committee member.

SUBJECTS AND COMMITTEE PERSONNEL

FINANCE

WALTER STABLER
Comptroller, Metropolitan Life Insurance Co.

The largest institution in the United States making loans for building construction. Mr. Stabler's knowledge of building investments covers the country and is widely recognized.

CO-OPERATIVE FINANCING

FREDERIC CULVER
President, Culver & Co., New York

A specialist in the financing and development of co-operative house projects. Mr. Culver has successfully developed approximately 25 million dollars' worth of co-operative apartment houses. He is an attorney and has had long experience in financing and construction of this nature.

REAL ESTATE

C. STANLEY TAYLOR

Widely experienced in real estate development and financing, real property law, architecture, engineering and building construction. Financial and Business Editor of THE ARCHITECTURAL FORUM.

FIRE PROTECTION ENGINEERING

J. D. HUNTER
Chief Engineer, Marsh & McLennan, Insurance Brokers, New York

Specialist in insurance engineering as applied to building design, construction and equipment.

HOTEL DESIGN AND EQUIPMENT

DANIEL P. RITCHEY

Known in the hotel field as the "hotel doctor." Mr. Ritchey, who is an engineer as well as an experienced hotel owner and manager, is qualified to answer any questions which may arise in this connection.

BUILDING MANAGEMENT

J. CLYDESDALE CUSHMAN
President, Cushman & Wakefield, Inc., Real Estate, New York, Former Secretary, Building Managers and Owners' Association of New York

Mr. Cushman's firm has participated largely in the promotion and operation of many large New York buildings. His specialty is the management of office buildings.

ELECTRICAL SCIENCE

WILLIAM L. GOODWIN
Assistant to the President and in charge of activities of the Society for Electrical Development

This Society is organized to promote accurate knowledge of the practical application of electricity. Its activities extend from the simple problems of household equipment to highly developed electrical plants. Particular attention is given the development of provision for electrical service in buildings.

SAFETY ENGINEERING

S. J. WILLIAMS
Secretary and Chief Engineer, National Safety Council, Chicago

Safety engineering is an important factor in the design of buildings where large groups of people congregate. The National Safety Council has investigated construction and devices with the greatest minuteness.

FARM SCIENCE

FREDERICK WALTER IVES, B.S., M.E.
Professor and Head of Department of Agricultural Engineering, Ohio State University. Consulting Agricultural Engineer, Columbus, Ohio.

Specialist in land drainage, soil improvement, surveys, farm arrangement for economical production, purchase of equipment and economical layout of farm buildings with special reference to interior arrangement.

THE FORUM DIGEST

A SURVEY OF IMPORTANT CURRENT ARTICLES ON BUILDING ECONOMICS AND BUSINESS CONDITIONS AFFECTING CONSTRUCTION

The Editors of this Department select from a wide range of publications matter of definite interest to Architects which would otherwise be available only through laborious effort

WHAT SECRETARY HOOVER IS DOING FOR THE BUILDING INDUSTRY

THESE extracts are from a recent letter written by Herbert Hoover to President Harding and presented in a bulletin of the U. S. Department of Commerce:

"That there is a national shortage of houses requires no repetition. The shortage probably amounts to nearly a million homes—and is, of course, the result of suspension of building during the war. Since that time high costs of building material and labor (due also to increased intermittence of employment) have prohibited the erection of little more than current necessities without recovery of the lost ground.

"Effort has already been made by the Department of Commerce which has, I believe, at least contributed to the resumption of construction during the past few months on a scale larger than at any period since the war began. As the result of your request that this Department should interest itself in the matter (following upon the report of the Senate Committee on Housing), a sum of $50,000 was appropriated by congress for the Housing Division in this Department.

"Our first effort was through co-operation with unofficial bodies in bringing about local conferences on the housing situation in the different cities with a view to ameliorating conditions. These conferences have been held in over 100 cities. Positive plans have been worked out in many of them and great stimulation to home building has ensued; where they have gone upon the rocks it has been on account of corrupt conditions of the building trades and over wage questions.

"In addition to local effort we have created a number of agencies, mostly voluntary, for the purpose of securing constructive solution to some of the more general problems that cause the blockade on housing. Various committees have been established and are engaged in sincere efforts in these fields: the General Situation in the Construction Industry; Simplification of Municipal Building Rules; Simplification of Plumbing Requirements and Practice; Standardization of Contractors' Specifications; Expansion of Small House Design Bureaus; Simplification of Clay Products, Lighting Fixtures, Lumber, Paint and Varnish, and in many other directions. By all these agencies much good has been accomplished in a quiet and efficient manner.

"Among other things developed by these conferences was the total absence of any adequate comparative price data respecting building materials in various localities. This matter has been gradually developed in the Department, and the spread of these comparative prices to the local conferences has resulted in many reductions."

STANDARDIZING CODES

As an example of problems of national scope it was strongly emphasized in the investigation of the Senate Committee on Reconstruction that the disordered and expensive requirements of our municipal building rules are estimated to impose a 10% to 20% unnecessary cost upon housing. In this matter, the committee appointed comprised:

Ira H. Woolson, Chairman.
Consulting Engineer, Nat'l Board of Fire Underwriters, New York.
Edwin H. Brown, Architect, Minneapolis.
Chairman, Committee on Small Houses, American Institute of Architects.
William K. Hatt, Professor of Civil Engineering, Purdue University.
Director, National Research Council.
Rudolph P. Miller, Ex-Superintendent of Buildings, New York.
Chairman, Building Officials Conference.
J. A. Newlin, Forest Products Laboratory, U. S. Dept. of Agriculture.
Ernest J. Russell, Architect, St. Louis.
Chairman, Nat'l Board of Awards for Jurisdictional Disputes in the Building Industry.
Joseph R. Worcester, Consulting Engineer, Boston.

This committee is drafting a simplified set of municipal building rules embracing the best practice of the art, and this work is well advanced. It has involved a large amount of co-operation with municipalities and with different trades and professions. Arising out of this we have also appointed a committee who are hard at work upon plumbing questions:

George C. Whipple, Chairman.
Director, School of Sanitation, Harvard University.
William C. Groeniger, President,
American Society of Sanitary Engineering.
William J. Spencer,
Secretary-Treasurer of Building Trades Dept., American Federation of Labor
H. Y. Carson, Research Engineer,
American Cast Iron Pipe Company, Birmingham, Ala.
A. L. Webster, Sanitary Engineer,
112 East 40th street, New York.
A. E. Hansen, Sanitary Engineer,
2 Rector street, New York.
Thomas F. Hanley, Chairman,
Standardization Committee,
Nat'l Association of Master Plumbers

This committee is making good progress, and much experimental work is being done at the Bureau of Standards in the direction of simplification of plumbing requirements.

I appointed a national committee in the matter of city zoning in response to the urgent request of many interested national associations with a view to development of larger vision and more uniform legislation upon this subject. The committee comprises:

Louis A. Moses, Cleveland,
Representing the Nat'l Association of Real Estate Boards.
J. Horace McFarland, Harrisburg, Pa.,
Representing the American Civic Association.
Nelson P. Lewis, New York
Representing the Nat'l Municipal League and the Nat'l City Planning Conference.
Lawrence Veiller, New York,
Representing The Nat'l Housing Association.
Morris Knowles, Pittsburgh,
of the United States Chamber of Commerce.
Edward M. Bassett, New York,
Chairman of the Zoning Committee of New York.
Frederick Law Olmstead, Brookline, Mass.
President of the Society of Landscape Architects.
John Ihlder, Washington,
of the United States Chamber of Commerce.

FINANCING HOME BUILDING

There is one problem that has distinctly national character and upon which national thought could be advanced by conference; that is, the mobilization of finance of home building. We have mobilized the commercial capital of the country through the Federal Reserve Banks; we have mobilized the farm mortgage capital through the Farm Loan Bureau; we are considering mobilizing production capital for the farmers through another organization. The country badly needs a mobilization of the home building capital based upon our building and loan associations, insurance companies and savings banks. We have a sound foundation upon which to build some sort of structure that would reduce the cost of home building capital, give it more mobility to all regions and afford greater security. A conference to consider this problem would be of great value.

$58,000,000 IN HOUSING CONSTRUCTION FINANCING

FIFTY-EIGHT million dollars has been loaned by the Metropolitan Life Insurance Company throughout the United States to build homes and apartments. The Chicago Trust Company, handling the loans for the Metropolitan Company in Illinois, Wisconsin and Northern Indiana, announces that in that territory $3,400,000 of the fund has been spread sufficiently to build 1040 homes and apartments, while new buildings are now going up at the rate of 30 a month. These houses have been erected in 66 cities.

The unusual part of the plan, according to the banking officials, is the small average of each loan, which is said to indicate that the construction is done for small home builders. The Illinois loans average about $4,000 each, which is approximately half the value of building and lot in each case. The builders are given 3 to 15 years in which to repay the loans.

The banking officials say that the Metropolitan Company does about as much clerical work in making one of these small loans as it would in putting out sixty million dollars in a few big loans, and that the large loan policy is the one usually favored by American companies with vast sums to invest. This is another reason why this large insurance company deserves great credit for placing such large sums in home building loans.

LABOR COST AND EFFICIENCY IN CARPENTER WORK

INTERESTING records that indicate the return of labor efficiency appear in the current issue of *Building Industry*, the official organ of The Builders' Exchange of Cleveland. The figures are taken from the original job records of R. E. Nixon, Cleveland contractor, and show the fluctuations in the cost of carpenter labor in the period 1914–1921 inclusive. To fully comprehend the reliability of the figures given it should be remembered that the houses erected are of identical size and finish, all built by Mr. Nixon and all located in the same general neighborhood in East Cleveland. The house is what might be termed a "stock" one, having a ground area 22 x 24, two stories in height, shingle roof, ordinary plumbing and hot air heating appliances. It contains 6 rooms and bath, the first floor being taken up by a living room, dining room and kitchen with 3 sleeping rooms and bath on the second floor. The figures given in the table cover the carpenter labor only, but it is interesting to note, from Mr. Nixon's statement, that the house complete was erected for about $2,300 in 1914 and 1915, the cost rising to approximately $6,100 in 1919 and receding to about $4,500, the figure it could be built for at the present time.

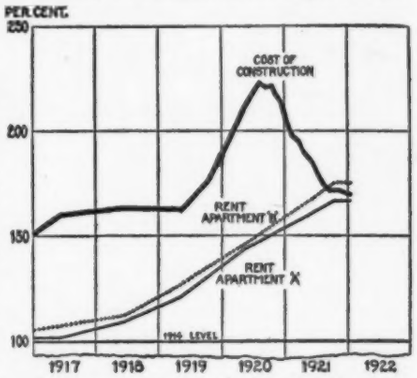
Because of war time restrictions on the building business, no houses of this type were constructed by Mr. Nixon during 1918.

Job No.	Year	Wage scale	Hours	Cost
14	1914	52½c.	656	344.40
19	1914	55	721	396.55
21	1914	55	629	345.95
28	1915	55	573	315.15
39	1915	55	492	270.60
40	1915	55	572	314.60
42	1915	55	463	264.65
43	1916	60	477	286.20
47	1916	60	584	350.40
48	1916	60	521	312.60
50	1916	60	612	367.20
52	1917	60	533	319.80
53	1917	60	557	334.20
54	1917	60	544	326.40
56	1917	60	591	354.60
59	1917	60	568	340.80
60	1917	70	512	358.40
61	1917	70	504	352.80
91	1919	80	687	549.60
93	1919	85	790	671.50
94	1919	85	926	787.10
96	1919	90	899	809.10
97	1919	90	1214	1092.60
121	1919	1.00	1108	1108.00
122	1920	1.00	1046	1046.00
123	1920	1.00	792	792.00
125	1920	1.00	775	775.00
130	1920	1.25	848	1060.00
133	1921	1.04	814	846.56
137	1921	1.04	673	699.92

APARTMENT RENTS AND CONSTRUCTION COSTS

A STUDY recently completed by the Federal Reserve Bank of New York shows that the rents paid by clerical and other workers receiving moderate sized salaries in New York are at present about 70 per cent higher than in 1914. Rents of the more expensive of the moderate priced apartments increased slightly more than those of the less expensive.

The accompanying diagram shows the changes in rents for two types of apartments, those renting for less than $15 per room in 1920, and those renting for between $15 and $30 per room in 1920. A third line in the diagram shows the changes which have taken place since 1917 in the cost of building construction in New York. Reductions in building costs during 1921 have brought that curve to about the same point as the index figures for rents. While there are other factors determining rents than construction costs, such as legal restrictions, interest rates and the availability of funds, taxes, and the shortage or surplus in the supply of dwellings, construction costs may be considered the major factor.



Apartment A Renting for Less than $15 per Room in 1920. Apartment B Renting for Between $15 and $30 per Room

The index figures shown for rents are averages of the percentage changes for typical buildings reported by 21 owners and operators of apartments. Rates of rental were calculated on the basis of continuous occupancy. The average index figures are given in the table at the foot of this page, together with other indices for changes in rents prepared by different agencies. The index numbers prepared by the United States Bureau of Labor Statistics and the National Industrial Conference Board are for buildings occupied by wage earners and are of a somewhat less expensive type than those included in the indices prepared by this bank.

The cost of construction index presented in the diagram is used through the courtesy of the George A. Fuller Co.

Labor costs entering into the index are computed on the basis of the pre-war efficiency of labor. If allowance were made for changes in efficiency the figures for 1920 would probably be higher, but no appreciable change would be made in the present level of the index, since the rate of output per man is now not far from the pre-war rate.

Apartment Rents and Construction Costs in New York City and the United States

(1914 = 100)

Index	1914	1915	1916	1917	1918	1919	1920	May 1921	Oct., 1921	Jan., 1922
RENTS:										
Federal Reserve Bank (apartments, type A, renting under $15 per room in 1920)	100	101	102	102	110	121	144	160	167	167
Federal Reserve Bank (apartments, type B, renting $15 to $30 per room in 1920)	100	101	102	107	112	127	145	166	175	175
U. S. Bureau of Labor Statistics (for New York City)	100	100	100	103	107	113	132	142	144	146*
U. S. Bureau of Labor Statistics (for U. S.)	100	102	102	100	109	114	135	159	160	161*
National Industrial Conference Board (for U. S.)	100	100	102	105	115	128	151	171	169	169
CONSTRUCTION COSTS (George A. Fuller Co., New York City)	100	112	143	164	168	168	230	193	177	173

*Dec. 1921.

SERVICE SECTION
of THE ARCHITECTURAL FORUM

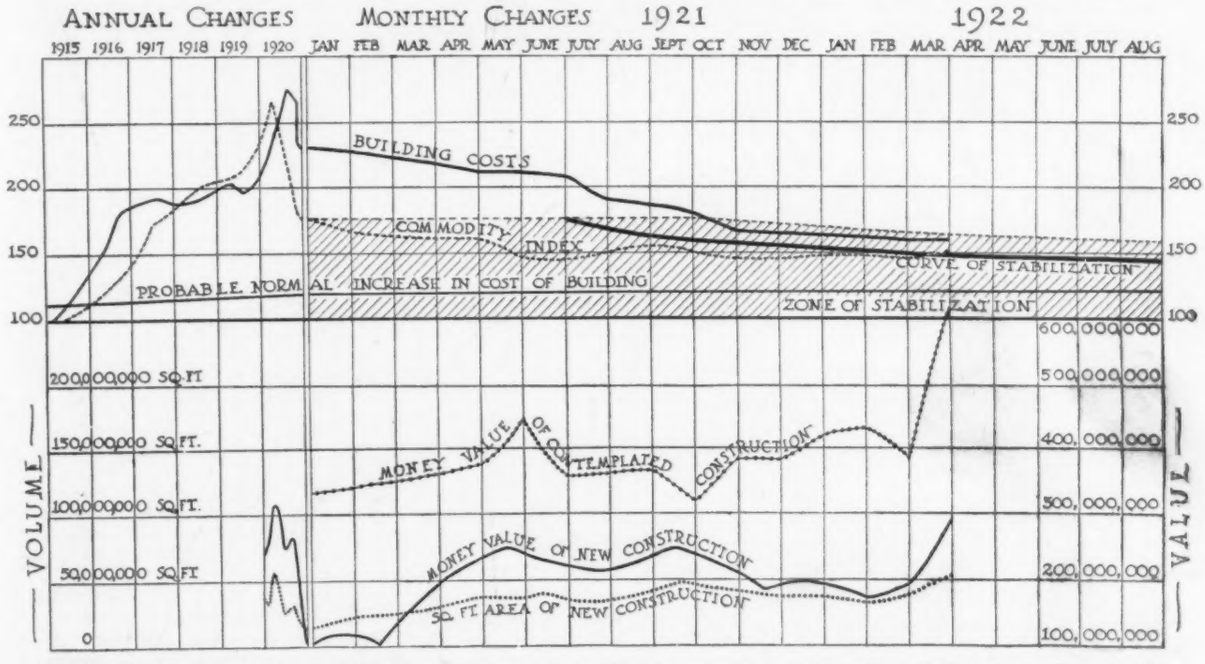
Information on economic aspects of construction and direct service for architects on subjects allied to building, through members of THE FORUM Consultation Committee

The Building Situation

EARLY last summer THE ARCHITECTURAL FORUM predicted an upward turn of building activity beginning in the fall of 1921 and developing more rapidly in the spring of 1922. An analysis of the chart below will show that these predictions have been verified by facts.

The figures on contemplated construction and building volume for March, 1922, exceed the most optimistic prediction which THE FORUM has made. In the discussion of the building situation in the April issue, it was indicated that the confidence of investors was being rapidly reëstablished. We reported that there was every reason to expect a quickly developed volume of business. It is, therefore, with satisfaction that we note the month of March showing the largest volume of construction in approximately two years, together with an unusual volume of contemplated construction.

Residential building continues to add the largest single quota to the general volume of building, although the rapid rise of the money value of new construction in comparison with the moderately rising line of volume shows that buildings of higher cubic foot costs than dwellings are being erected in considerable quantity. The various factors which control activity in the building field are pointing more definitely to a period of stabilization and indicate an increasingly encouraging outlook. Money available for new construction increases in amount, and the cost of financing is decreasing. The labor situation seems to be calming down and it is anticipated that there will not be any reaction of building cost increase as a result of the increased volume. Manufacturers and others who control factors of building cost would make a serious mistake to attempt any price increase at this time. Profits must be taken on volume of business, and in so doing no barriers to progress will be raised.

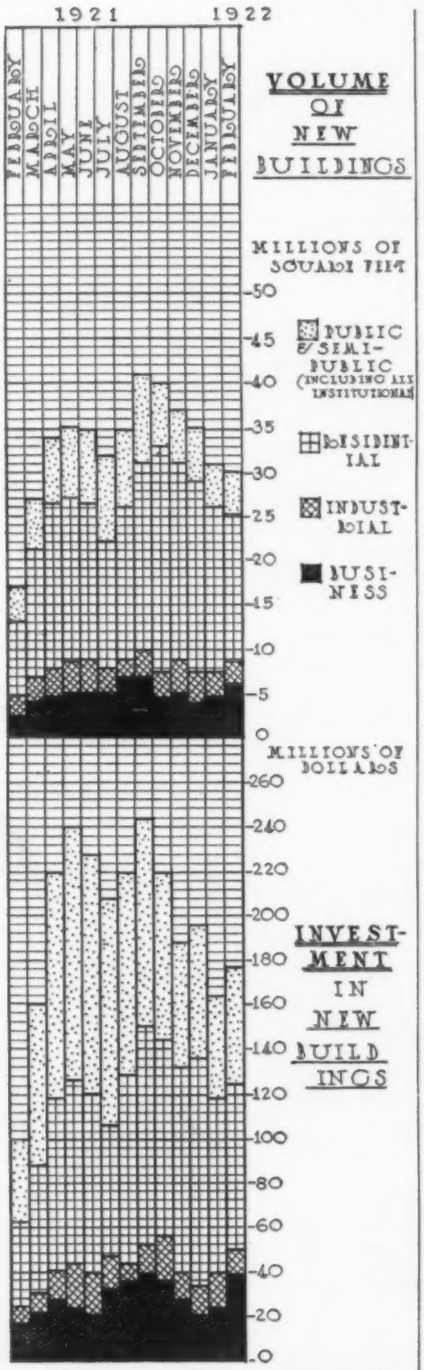


THIS chart is presented monthly with trend lines extended to the most recent date of available information. Its purpose is to show actual changes in the cost of building construction and the effect upon new building volume and investment as the *index line of building cost* approaches or recedes from the "curve of stabilization."

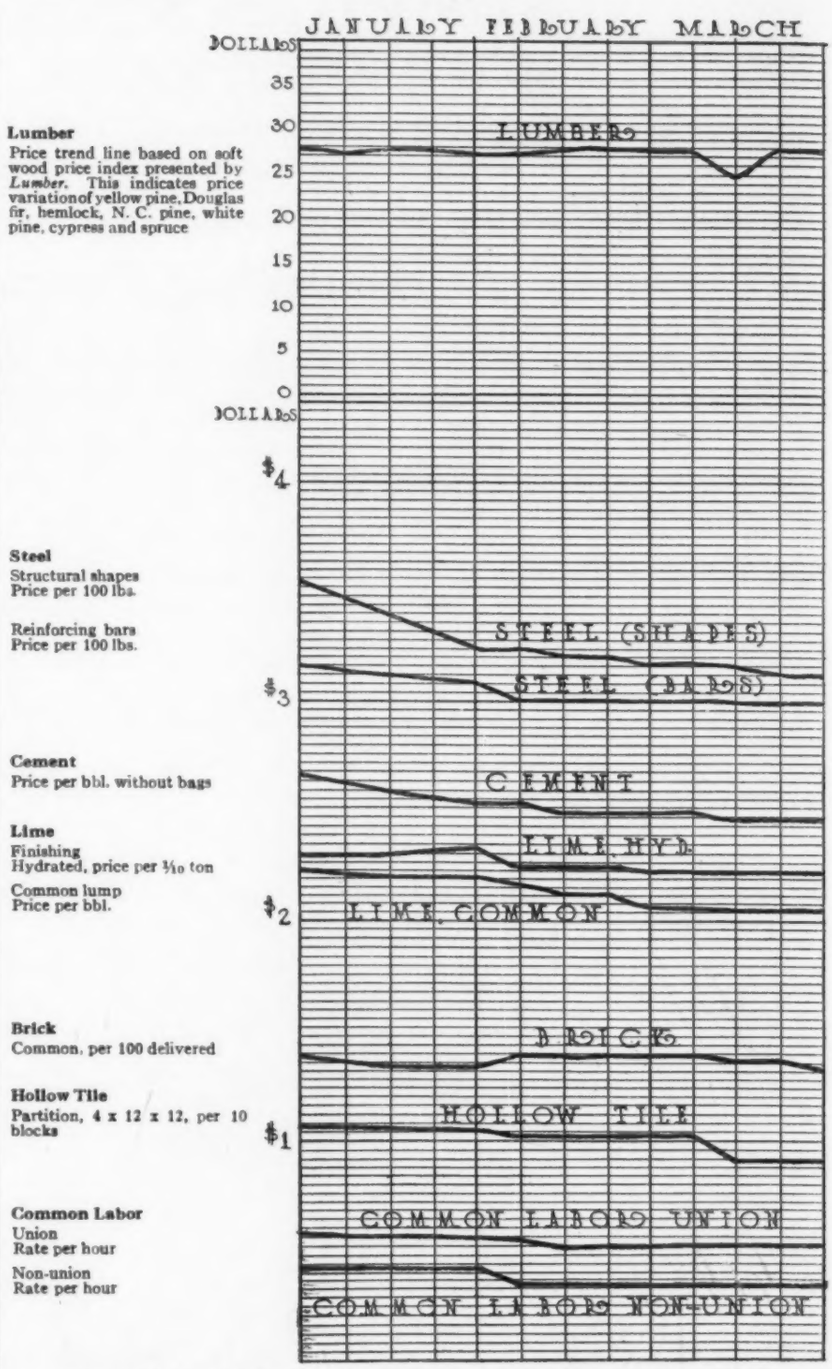
The CURVE OF STABILIZATION represents the building cost line at which investors in this field may be expected to build without fear of too great shrinkage in the reproduction value or income value of new buildings. The index line representing actual cost of building entered the ZONE OF STABILIZATION in the fall of 1921. If this cost line passes *out* of the zone of stabilization, building volume will decrease materially.

The degree of the curve of stabilization is based on (a) an analysis of time involved in return to normal conditions after the civil war and that of 1812; (b) the effect of economic control exercised by the Federal Reserve Bank in accelerating this return after the recent war, and (c) an estimate of the probable normal increase in building cost.

Factors of Fluctuation in Building Costs



Analysis of new construction showing comparative importance of major building types in volume and investment.



Figures used in developing all trend lines represent average prices to contractors in following cities: New York, Chicago, Denver, Seattle, Minneapolis, Atlanta, Dallas and San Francisco

THE chart at the left shows in square feet and in dollars the volume of new building construction since February, 1921. It will be noted that the volume for each month is divided into four building types. This makes possible a comparison of the amount of money spent in each of these divisions of the building field in relation to the volume of new buildings developed. It is interesting to note that while the area of new construction in public or semi-public buildings is much smaller than in the residential types, the amount of money expended is almost as great. This indicates a comparative value of the costs per square foot.

The cost trend of the material market has not changed materially, although it is still slightly downward. The most definite factors in cost decrease for the month of March are those of hollow tile and common brick. The reductions are slight, however, and chiefly evident in the east and middle west districts. Any prolonged duration of the coal strike will seriously affect the production of these industries and there are now no large stocks on hand to constitute a reserve for spring building. The unusual volume of new construction and contemplated construction which has developed in March is encouraging both to architects and manufacturers. It is highly important that further cost reductions shall be in order rather than any increase on the basis of increasing demand.

BUILDING MATERIAL PRICES

Table Showing Average Prices Paid by Contractors for Building Materials at Local Distributing Points as of Mar. 1, 1922. Prepared by Division of Building and Housing of the Department of Commerce from Prices Secured through the Bureau of Census

Commodity	Size or Condition	Unit	Mass.	N. Y.	Penn.		W. Va.	S. C.	Fla.		Mich.		Wis.		Minn.	Iowa			Kan.	Mo.
			Haverhill	Buffalo	Pittsburgh	Erie	Fairmont	Columbia	St. Petersburg	Tampa	Detroit	Pontiac	Saginaw	Milwaukee	Duluth	Cedar Rapids	Waterloo	Council Bluffs	Kansas City	St. Louis
Common Brick		1,000	$20.00	$17.12	$16.00	$15.75	$21.00	$10.50	$18.00	$12.45	$16.50	$14.40	$12.00	*$12.50	$17.50	$14.40	$14.90	$17.50	$16.50	*$14.00
Portland Cement	Excl. of containers	Bbl	2.80	2.36	2.02	3.00	2.30	2.83	3.60	3.30	2.85	2.19	2.10	*2.40	2.40	2.26	2.33	2.40	2.70	*2.40
Yellow Pine No. 1	Dimension 2x4-16' S1S1E	M.	60.00	32.00	47.00	46.00	35.50	.....	28.00	27.00	40.50	32.50	45.00	*35.00	.....	.....	40.00	41.50	41.50	*39.00
Douglas Fir No. 1	Dimension 2x4-16' S1S1E	M.	.....	.....	.....	.....	.....	.....	.....	.....	40.50	.....	47.00	*35.00	35.00	.....	40.00	40.00	41.50	*42.75
N. Carolina Pine No. 1	Dimension 2x4-16' S1S1E	M.	.....	.....	.....	.....	35.50	17.00	.....	.....	40.50	32.50	.....	.....	.....	.....	42.00	.....	.....	.....
Common Boards No. 1	1x6	M.	40.00	29.50	45.00	.....	45.00	20.00	55.00	36.00	.....	39.00	37.50	*32.00	35.00	35.00	36.00	38.00	46.00	*42.00
Y. P. Flooring E.G."C"	1x4-10'-16'	M.	59.00	.....	78.00	.....	65.00	60.00	65.00	.....	.....	51.00	60.00	.....	85.00	86.00	94.00	100.00	78.00	*62.00
Douglas Fir V.G. No. 2	1x4-10'-16'	M.	.....	.....	.....	.....	.....	.....	.....	.....	67.50	.....	63.00	.....	75.00	90.00	94.00	100.00	63.00	.....
Red Cedar Shingles	Extra clear 16" 5 to 2	100 sq. ft.	6.00	5.70	4.68	5.25	5.00	5.00	.....	.....	4.53	5.75	5.00	*5.50	5.50	6.00	7.00	6.50	5.00	*6.27
Cypress Shingles	Extra clear 16" 5 to 2	100 sq. ft.	.....	.....	.....	7.00	.....	4.50	.....	4.90	.....	.....	.....	.....	.....	.....	9.00	.....	6.00	.....
Composition Shingles	Crushed slate surfaced	100 sq. ft.	6.00	.....	.....	7.00	*7.00	5.85	.....	7.50	.....	5.70	6.50	*6.50	6.00	5.75	8.00	8.25	5.80	*6.38
Gypsum Plaster Board	⅜"	1,000 sq. ft.	46.00	45.00	.....	50.00	25.05	32.00	.....	40.00	30.00	23.93	32.00	*32.00	43.00	40.00	25.00	.....	32.50	*43.25
Lime	Hyd. Com.	Ton	20.00	18.00	14.30	20.00	13.19	19.00	.....	14.80	15.20	13.70	18.00	*20.00	.....	16.00	20.00	.....	25.60	*20.00
Building Sand		Cu. yd.	2.50	1.28	1.95	2.50	3.40	.95	4.50	1.65	2.50	1.50	2.00	*1.50	1.25	.90	1.50	*2.43	2.35	*2.80
Crushed Stone	¾"	Cu. yd.	3.00	1.62	2.65	3.00	4.50	3.25	6.25	4.50	3.50	1.48	3.00	*2.50	2.60	2.03	3.00	*3.60	3.00	2.10
Window Glass	Single A 10"x12"	50 sq. ft.	3.50	3.90	2.80	.....	4.20	4.09	.....	.....	3.60	.....	5.40	.....	5.00	.....	7.00	.....	4.50	*4.50
Hollow Tile	8"x12"x12"	Each	.26	.19	.13	.18	.14	.14	.20	.18	.....	.17	.15	*.14	.....	.12	.12	.....	.22	.....
Cast Iron Pipe	4" E.H. 13 lbs. per ft.	Ton	.....	58.80	47.50	.....	43.00	.....	.....	.....	53.00	52.00	45.00	.....	50.40	53.90	45.00	.....	.....	.....
Steel Pipe	1" galv.	100 ft.	.....	10.00	7.06	.....	8.60	9.00	12.00	10.15	.....	8.50	8.75	.....	9.30	9.61	9.50	.....	.....	.....
Reinforcement Bars	½" square	100 lbs.	2.40	.....	1.55	.....	2.00	3.20	5.00	2.50	2.60	2.40	2.85	*2.25	.....	2.75	2.10	3.05	2.90	1.88
Structural Steel	Fab. 6" I-beams	100 lbs.	4.00	2.65	.....	.....	2.85	3.50	.....	3.50	3.50	2.25	3.00	.....	3.25	4.00	3.20	4.80	3.75	.....
Gypsum Plaster	Neat	Ton	22.00	13.50	16.40	24.00	14.90	16.90	23.00	22.50	19.00	13.90	15.00	*17.00	21.50	14.20	13.60	17.50	15.50	*19.50
Roofing Slate	No. 1 Ribbon	100 sq. ft.	.....	8.00	11.00	.....	10.25	12.00	.....	19.00	.....	17.10	.....	.....	2.75	.....	20.00	.....	.....	.....
Tar Paper, Roofing	2-ply 75 lbs. per roll of	100 sq. ft.	2.25	2.00	1.95	2.15	.....	2.15	.....	2.50	.....	2.75	2.75	*2.00	1.00	.....	2.45	2.90	.....	.....
Rosin Sized Sheathing	3-ply 30 lbs. per roll of	500 sq. ft.	1.50	1.00	1.35	.85	.85	1.00	1.25	1.25	.....	1.00	.....	.....	.....	1.10	1.47	1.50	1.20	*.83

*F.O.B. job

Commodity	Size or Condition	Unit	Ill.	Ohio					Ky.	Ark.	La.		Texas		Wash.	S. D.	Calif.	
			Chicago	Cleveland	Akron	Warren	Dayton	Cincinnati	Toledo	Louisville	Little Rock	New Orleans	Shreveport	Dallas	San Antonio	Seattle	Sioux Falls	Sacramento	San Francisco	Pasadena
Common Brick		1,000	$11.00	*$14.00	$13.50	$15.90	*$17.50	$16.00	*$15.00	$15.00	$12.50	$11.00	$15.00	$11.00	$16.00	$13.00	*$18.00	*$17.00	$15.50	*$17.00
Portland Cement	Excl. of containers	Bbl.	1.87	*2.64	2.53	2.36	*3.32	2.37	2.20	2.38	3.70	2.55	3.80	3.00	3.00	3.35	*2.60	2.79	2.55	* 3.30
Yellow Pine No. 1	Dimension 2x4-16' S1S1E	M	41.00	*46.00	40.00	48.00	*45.00	*38.50	41.00	.....	30.00	27.00	41.00	30.00	45.00	.....	.....	.....	.....	.....
Douglas Fir No. 1	Dimension 2x4-16' S1S1E	M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15.00	*37.00	27.50	30.00	*48.00
N. Carolina Pine No. 1	Dimension 2x4-16' S1S1E	M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Common Boards No. 1	1x6	M	36.00	*54.00	40.00	45.00	*40.00	*60.00	60.00	.....	32.00	30.00	43.00	25.00	48.00	15.00	*35.00	22.00	28.00	*46.00
Y. P. Flooring E.G."C"	1x4-10'-16'	M	.....	.....	70.00	65.00	.....	.....	75.00	.....	45.00	.....	82.00	48.00	75.00	.....	.....	.....	.....	.....
Douglas Fir V.G. No. 2	1x4-10'-16'	M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	55.00	*84.00	65.00	65.00	*85.00
Red Cedar Shingles	Extra clear 16" 5 to 2	100 sq. ft.	.....	*7.00	6.50	5.60	*5.40	*4.80	5.60	.....	4.75	.....	7.00	4.50	7.00	2.80	*4.60	6.25	5.00	*6.50
Cypress Shingles	Extra clear 16" 5 to 2	100 sq. ft.	.....	.....	.....	.....	.....	.....	.....	.....	4.50	4.50	8.50	.....	.....	.....	.....	.....	.....	.....
Composition Shingles	Crushed slate surfaced	100 sq. ft.	.....	.....	.....	7.50	*6.50	*5.75	6.30	.....	6.50	.....	8.00	8.00	8.00	.....	*7.50	.....	.....	.....
Gypsum Plaster Board	⅜"	1,000 sq. ft.	.....	*53.00	47.50	45.00	*37.50	.....	34.00	.....	35.00	.....	34.00	33.00	52.00	42.50	*32.00	.....	40.00	*44.40
Lime	Hyd. Com.	Ton	14.70	*14.00	17.00	13.10	*14.00	13.00	13.20	24.00	24.00	14.00	27.50	14.00	22.50	24.00	*22.50	.....	22.00	*32.00
Building Sand		Cu. yd.	2.50	*2.50	1.65	2.16	*1.85	1.50	2.22	1.30	1.00	1.50	2.00	2.50	2.75	2.00	.....	1.25	1.50	*1.75
Crushed Stone	¾"	Cu. yd.	2.13	*3.50	3.25	.....	*1.85	1.65	2.19	1.40	2.00	2.70	5.00	2.50	2.60	.....	.....	2.25	2.50	*3.75
Window Glass	Single A 10"x12"	50 sq. ft.	.....	.....	3.60	.....	*5.00	.....	.....	.....	5.00	.....	4.50	.....	5.40	.....	.....	6.00	4.50	.....
Hollow Tile	8"x12"x12"	Each	.....	.....	.12	.....	*.19	.....	.15	.13	.20	.19	.19	.22	.21	.25	.....	.....	.18	.....
t Iron Pipe	4" E.H. 13 lbs. per ft.	Ton	.....	.....	49.28	.....	*60.00	.....	.....	.....	65.00	.....	77.00	.....	59.00	50.00	.....	.....	44.60	.....
Pipe	1" galv.	100 ft.	.....	.....	8.36	.....	*9.50	.....	.....	.....	11.00	.....	9.40	.....	9.40	10.25	.....	.....	8.40	.....
ement Bars	¼" square	100 lbs.	.....	.....	2.75	.....	*3.00	.....	.....	2.27	3.25	3.50	3.60	2.55	3.75	3.25	.....	3.90	2.75	.....
Steel	Fab. 6" I-beams	100 lbs.	.....	.....	2.75	.....	*4.00	.....	.....	.....	3.50	3.30	4.00	4.50	3.80	5.00	.....	.....	3.65	.....
ter	Neat	Ton	.....	.....	16.30	15.10	.....	14.00	14.50	.....	25.00	.....	24.00	14.00	24.00	19.00	*18.00	.....	14.80	*20.00
	No. 1 Ribbon	100 sq. ft.	.....	.....	11.50	.....	.....	.....	.....	.....	16.00	.....	12.00	.....	.....	30.00	.....	.....	.....	.....
ing	2-ply 75 lbs. per roll of	100 sq. ft.	.....	*2.50	.....	.....	*2.50	*2.25	.....	.....	2.25	2.00	2.25	1.25	2.58	2.50	*3.00	.....	.....	*2.55
g	3-ply 30 lbs. per roll of	500 sq. ft.	.....	.....	.....	.....	*1.25	.....	.....	.....	1.25	.....	1.25	2.50	1.80	1.20	*1.15	.....	2.00	.....

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A group of nationally known experts on various technical subjects allied to building, providing a direct service to architects

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The Probable Trend of Construction Costs

By H. H. FOX
Vice President, Turner Construction Company

IN discussing this subject two factors are to be considered: (1) the economic situation in general, and (2) the building situation in particular.

1. The Economic Situation.

Owing to the vast amount of literature which is published on this subject by banks, statistical bureaus and other organizations, and with which most business men are already familiar, it is necessary only to sketch the salient points. The index figures used in this article refer, unless otherwise noted, to an assumed base of 100 for the year 1913.

1. Bradstreet's index of commodity prices reached a maximum of 235 in March, 1920, fell to a minimum of 120 in June, and has since then risen steadily and now stands at 128.

2. The cost of living index, published by the National Industrial Conference Board, rose to a maximum of 197 in June, 1920, declined to 155 in June, 1921, and since then has been practically constant.

3. Wages, as compiled by the U. S. Bureau of Labor Statistics, rose to a maximum of 230 in October, 1920, fell to 164 in November, 1921, and rose to 170 in December, 1921.

4. The amount of employment in 600 establishments in the United States, as compiled by the U. S. Bureau of Labor Statistics, reached a maximum of 124 in March, 1920, fell to 85 in January, 1921, and now stands at about 96.

5. The reserve ratio of the Federal Reserve System started at 100% when the system was established in 1914, fell to 42% in the early part of 1920, and now stands at about 80%.

6. After the civil war commodity prices dropped with comparative rapidity for about five years and then remained fairly steady for five years more. It should be noted, however, that the drop which has taken place since the great war is already as great as the entire drop which developed after the civil war up to the year 1874. In other words, the fall in prices has been about three times as rapid as it was after the civil war.

The general conclusion of the authorities best informed on the subject appears to be that although prices may decline slowly over the major cycle of 20 or 30 years, the decline for the present minor cycle of from three to five years is probably over.

2. The Building Situation.

Various factors have prevented the trend of building costs in the last two years from paralleling commodity prices.

The first factor is the great deficiency in building construction which occurred during the war. This is shown on the accompanying chart, prepared by the American Telephone & Telegraph Company. The deficiency for the years 1917 to 1921 inclusive amounts to about two full years of normal construction work. Figures are not available to show how much of this deficiency is in residential buildings and how much in industrial buildings; undoubtedly the greater part is in residential buildings, but as there is a considerable similarity in the kind of labor and materials used in the two classes of buildings, the construction which is necessary to overcome this deficiency in residential buildings has kept up the prices of all kinds of construction work.

The fact that this deficiency is real is shown by reports from all over the country. The January report of the F. W. Dodge Company claims that building contracts awarded in January, 1922, in 27 states in the eastern part of the United States were 49% greater than in January, 1921, and that the total is the second largest for January on record. The March issue of the *Monthly Review of the Federal Reserve Agent of New York* reports that new building operations in New York state and northern New Jersey during January were 2½ times as great as in January, 1921.

A second factor in preventing rapid decline in building costs during the periods of depression is the fact that as a rule no large stocks of building materials are carried at the sources of production and the factor of liquidation is largely absent. The situation which exists with cotton and wheat, for example, where the farmer produces all he can without having any idea what the demand will be when his crop is marketed, does not exist at all in the building material industry in which materials will not be manufactured unless they can be sold for more than their cost.

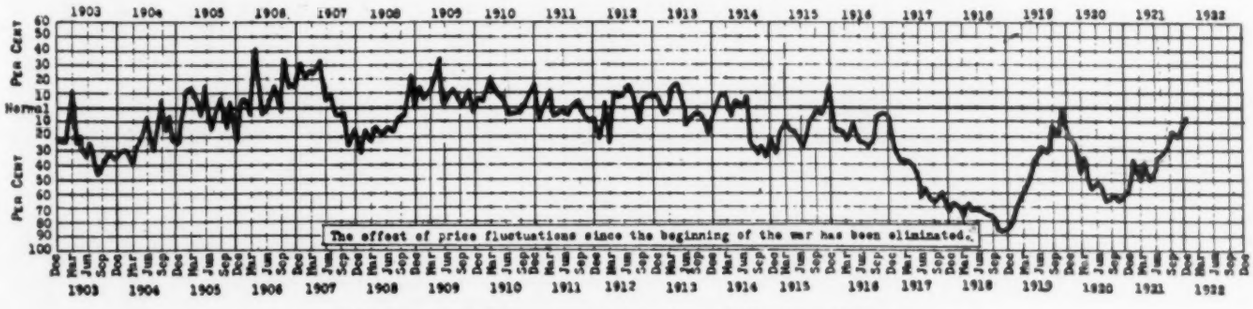
The third factor is the high percentage of labor cost in the construction of a building as compared with the cost of materials. Labor's share of the wealth produced by the country is constantly increasing, but in many cases this does not necessitate an increase in the cost of the finished product because new machinery is constantly being introduced which offsets the higher wages of labor. Building construction, however, is largely handwork, and it is possible only to a limited extent to introduce labor-saving machinery.

According to Moody's Investors Service wages are four times as great today as they were in 1860, but building material costs are only twice as great.

The index figures for residential building costs today, according to Babson's Reports, are 195 and for industrial buildings 168. This checks closely our own studies for New York where there has been no reduction in wages. In other districts, however, where labor has been liquidated, our studies show an index today for industrial buildings of approximately 145.

Babson gives it as his opinion that building costs will not decrease during 1922, owing to the large demand for buildings, but that a decrease will take place in 1923. We agree with his opinion as to 1922, especially in view of the fact that labor efficiency, which is now high, will decrease as labor becomes more fully employed; and contractors, after business begins to improve, will no longer be satisfied with the practically negligible margin of profit which has prevailed during the past year. We are not prepared to express an opinion as to 1923, excepting that if a decrease does take place it will be slight and not sufficient to warrant an owner in postponing the construction of a building which he needs at present.

As practical evidence that the economic opinions just given are actually working out, it is interesting to note that since Christmas, 1921, we have closed 28 contracts for a total of a little over $6,000,000 worth of business. These three months, that is, January, February and March, are the best three months that our company has had since early in 1920, and we are much encouraged by this "brass tack" evidence that the turn has come.



Record of new building permits in 19 cities, excluding New York, over 20 years, showing value of permits compared with estimated normal

THE FORUM DIGEST

A SURVEY OF IMPORTANT CURRENT ARTICLES ON BUILDING ECONOMICS AND BUSINESS CONDITIONS AFFECTING CONSTRUCTION

The Editors of this Department select from a wide range of publications matter of definite interest to Architects which would otherwise be available only through laborious effort

THE UPWARD TREND TO BUSINESS PROSPERITY

THERE is presented herewith an unusually interesting chart prepared by Emerson Work Axe in connection with a recent article in the New York *Evening Post.*

"This chart is a graphic summary of the cyclical oscillations of American business above and below the normal expectation for each year since 1877. It pictures the revival of prosperity that followed the resumption of specie payments and the bumper crops of 1879, the prosperity of the early eighties, the crisis of 1884, the revival of 1885-86, the boom of 1889-90, the slight share of the United States in the crisis of 1890, the revival that followed the extraordinary harvest in 1891, the great panic of 1893, the prolonged hard times that followed (interrupted by the brief and partial revival of 1895), the return of prosperity that began in 1897, our partial share in the European crisis of 1900, our own 'rich man's panic' in 1903, the revival that started in the autumn of 1904 and grew into the boom of 1906, the crisis of 1907, the rapid revival in 1908-09, the reaction in 1910-11, the improvement in 1912, the return of dullness in 1913 merging into the deep depression of 1914, the upward rush to a new peak of prosperity in 1916, the difficulties of maintaining business at this peak after we entered the war, the brief depression that followed the armistice, the new boom that surprised us in 1919, the turn of the tide in 1920, and the deep depression of 1921—a trifle deeper than any of its predecessors shown by the chart.

"No one who studies this chart with a realization of the vast mass of practical experience which it sums up year by year can doubt that business is really subject to cyclical oscillations. The chart gives no warrant for thinking of the business cycle as a strictly uniform sequence of precisely the same phenomena. But it does suggest that if the oscillations of the near future follow the precedents of 50 years the now vacant column for 1922 will be filled in by a line not unlike the lines of 1879, 1885, 1897, 1904-05 or 1908-09. Such a line as that of 1915 is scarcely to be expected and scarcely to be desired."

DECREASE IN BOSTON BUILDING COSTS

THE Boston *Evening Transcript* recently presented an interesting article which acknowledges the first cheerful smiles that the building industry has seen for several years. It seems that in Boston, according to the *Transcript*, "The building supply dealer smiles when he talks about his business, because it is good. The building contractor smiles when he finds a new contract to figure on, because he is reasonably sure that the contract will be awarded, which he could not be sure of a year ago, and when he loses one job he figures a little closer on the next and gets it. There is work enough in the field for all the contractors, and when they are busy, labor is employed.

"The consumer who foots the bill also has a smile, because the bill is smaller than it was last year. It is down to an attractive level.

"By way of illustration reference might be made to the large warehouse and office building that Joslin & Landry have just completed at 309 Dorchester avenue, South Boston, for the Berger Manufacturing Company. This building was in the market a year ago and several contractors figured on it, but it was held up because of the high cost. At that time Joslin & Landry submitted a bid of $109,000, and when the contract was refigured last fall this firm bid $70,000, in round figures, and has done the work for that price — a reduction of $39,000. Counting the square foot area, as is done in the case of certain types of industrial construction, this building was put up at less than $2 per square foot, its total floor area being 44,800 square feet.

"Dwelling house construction tells the same story of decline in cost. Contractors, engineers and building supply dealers report that the moderate dwelling house that cost $10,000 to build one year ago will cost only $8,000 today, and some reports indicate that it can be built for $7,500. Within the city limits it costs a little more than in the suburbs, because wages are a little higher.

"Cotton mill construction affords another illustration which is applicable to the textile centers of New England.

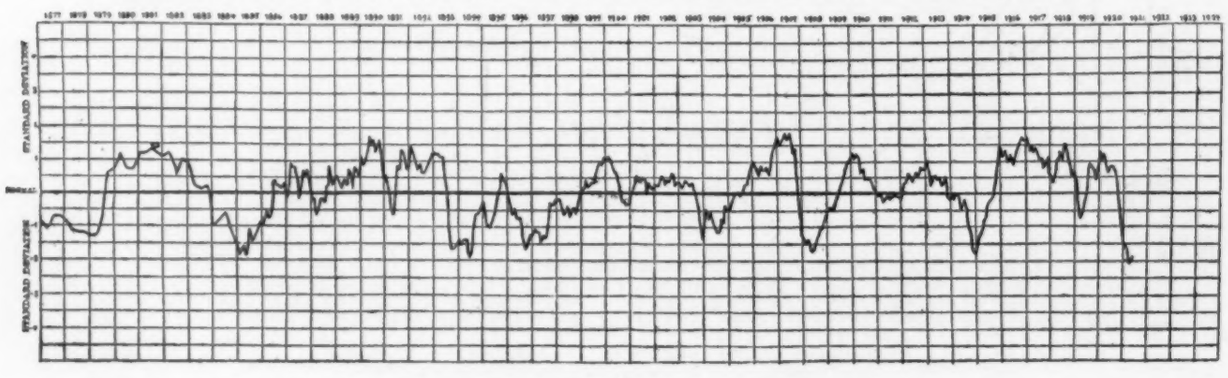
"The cost of cotton mill building and equipment has declined about 30 per cent from the high point reached in the last prosperity period. At the top, a typical mill cost about three times as much as in 1914. Today it costs about twice as much."

CURRENT BOSTON PRICES—MATERIALS IN INDUSTRIAL CONSTRUCTION

	Pre-war	Peak (June, 1920)		April, 1922	
	Price	Price	*P. C.	Price	*P. C.
Reinforced steel at mill, per cwt.	$1.25	$4.50	360	$1.50	120
Cement, per barrel	1.20	3.40	283	2.52	210
Crushed stone, per ton	1.25	2.75	220	1.75	140
Spruce form lumber, per thousand	25.00	70.00	280	48.00	192
Common brick, per thousand	9.00	27.00	300	15.50	172
Bricklayers, per hour	.62	1.25	200	.90	145
Carpenters, per hour	.55	1.00	182	.90	163
Common labor, per hour	.20	.70	350	.40	200
Weighted general index	....	....	267	....	173
Weighted labor index	....	....	240	....	174

*Percentages are based on pre-war prices taken as 100 per cent.

GENERAL BUSINESS ACTIVITY OVER FIFTY YEARS COMPARED WITH ESTIMATED NORMAL



BUILDING CONDITIONS IN PHILADELPHIA DISTRICT

A RECENT Bulletin of the Third Federal Reserve District contains the results of a careful study of building conditions with respect to housing in Philadelphia. Inasmuch as similar conditions hold in other centers we present the principal portions of the report.

Fig. 1 shows the number of building operations in Philadelphia each month from January, 1901, to February, 1922, and the monthly average for each year of that period. It is evident that although building operations showed violent seasonal fluctuations and also moderate yearly changes, the general trend from 1901 to 1916 was definitely upward. This normal growth is shown on the chart by the sloping straight line. The broken extension of the line after 1916 indicates the general course which building operations probably would have followed if the war had not intervened. The pronounced falling off in operations since our entry into the war is seen in the radical departure of the curves representing actual construction from this assumed normal. It is true that construction has recovered somewhat since the end of the war, but the monthly average for none of the last three years equaled that of any year in the period from 1903 to 1916, except that of 1908, when there was industrial depression.

Reference to Fig. 2 will show, however, that the value of building operations in 1919 and 1920 was even greater than in the years immediately preceding our entrance into the war. But a comparison of Figs. 1 and 2 clearly indicates that in value building operations were out of proportion to their physical volume. It will be noticed in Fig. 2 that the trend of construction in Philadelphia has been practically the same as that in 20 large cities of the United States during the period from 1914 to date. This chart is drawn on a logarithmic scale, which shows the relative increases and decreases, or the percentage rate of change, to better advantage than it shows absolute fluctuations.

BUILDING OPERATIONS IN PHILADELPHIA

Number of Operations by Classes of Buildings

	1914	1915	1916	1917	1918	1919	1920	1921
Residential:								
Two-story	6,418	8,806	7,204	2,386	884	4,642	923	1,912
Three-story	475	623	516	297	62	568	299	222
Frame	24	43	28	39	11	74	68	78
Apartments	33	9	4	5	..	4	9	15
Business:								
Office buildings	20	39	36	41	33	32	26	29
Stores	68	74	72	25	6	46	46	83
Warehouses	22	34	54	34	26	38	38	33
Hotels	3	2	3	2	1	1	0	1
Banks	2	4	3	3	1	1	5	7
Garages	394	595	878	833	480	1,322	1,153	1,569
Institutional:								
Churches	15	16	19	12	6	8	12	22
Schools	6	13	21	2	1	1	3	4
Industrial:								
Manufacturing buildings	64	77	102	72	48	97	89	67
Workshops	64	65	88	62	43	67	95	118
Alterations and repairs	3,226	2,983	2,846	2,337	2,103	3,792	5,133	4,902
Additions	1,614	1,659	1,546	1,177	914	1,921	2,043	2,638
All others	3,261	2,730	2,193	1,650	1,331	1,895	2,570	2,594
Total number	15,709	17,772	15,613	8,977	5,950	14,509	12,512	14,654
Total value*	$35,420	$39,444	$49,897	$34,016	$15,453	$65,089	$55,305	$42,791

*In thousands of dollars.

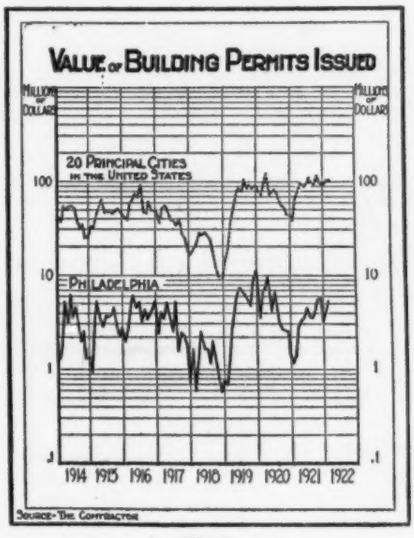


Fig. 2

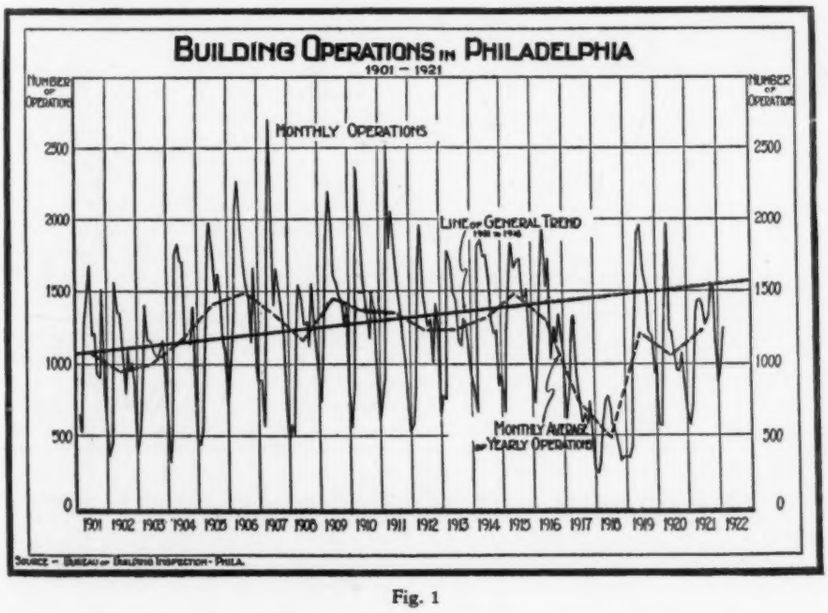

BUILDING OPERATIONS IN PHILADELPHIA
1901 – 1921
NUMBER OF OPERATIONS
MONTHLY OPERATIONS
LINE OF GENERAL TREND
1901 to 1916
MONTHLY AVERAGE FOR YEARLY OPERATIONS
2500
2000
1500
1000
500
0
1901 1902 1903 1904 1905 1906 1907 1908 1909 1910 1911 1912 1913 1914 1915 1916 1917 1918 1919 1920 1921 1922
SOURCE – BUREAU OF BUILDING INSPECTION - PHILA.

Fig. 1

Reports indicate that the shortage is greater in residential structures than in any other class of buildings. The table, "Building Operations in Philadelphia," shows that whereas industrial and business construction has continued without serious interruption since 1914, the building of houses and apartments has been cut down materially, and that a serious shortage still exists in spite of attempts in 1919 to supply the need for homes.

According to reports from builders and real estate dealers, the present demand in Philadelphia and other cities of this district is largely for homes costing less than $6,000 and for apartments renting for $50 per month and under. The question of greatest importance at the present time is whether or not construction costs are low enough to enable builders to meet this need. The Department of Labor's index of building material prices reached a maximum of 341 in April and May, 1920, and averaged for that year 308. In computing this index number prices in 1913 were taken as being equal to 100. Although prices have fallen greatly since that time, they are still double what they were in 1913, according to this index, which now stands at 202.

The National Federation of Construction Industries, however, publishes another index number, also compiled by the Department of Labor, which shows present building material prices as being only 60 per cent above those of 1913. Fig. 3 gives the relative prices of certain basic building materials at their maximum points and at present, as compared with their levels in 1913. Wages also in the building trades rose considerably after the war, but they, too, have declined somewhat. They are by no means uniform, however, throughout the United States. It has been estimated that the present level of wages paid in the building trades in Philadelphia is about 75 per cent above that of 1913. Fig. 3 shows the changes that have occurred in the wage rates paid to workers in certain building trades since 1913.

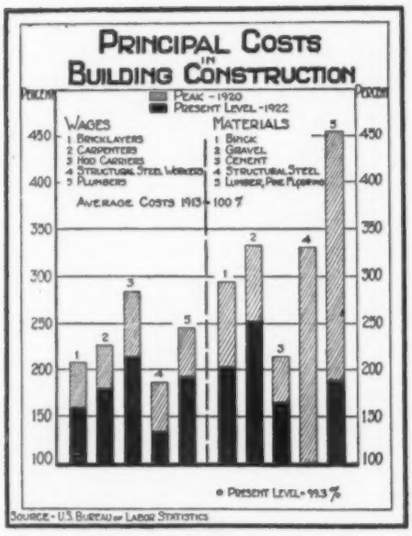


Fig. 3

Another factor that contributed to the delay in the revival of residential building was the lack of funds available for mortgages during the period from 1919 to 1921, but of late a larger volume of such funds has been available. Financial institutions are exercising considerable caution, however, in lending for real estate operations. Trust companies, for example, are unwilling to make loans on the basis of either the present selling price or the cost of construction. But they are willing to lend 60 per cent of their own valuation of the property, and this is based upon what they believe that property will be worth after a period of from three to five years. It is evident that bankers consider that construction costs are still too high. However, builders report that it is possible to obtain funds from individual mortgage investors up to 60 per cent of the actual cost.

BUILDING PERMITS

(14 Cities—Third Federal Reserve District)

Cities	February, 1922 No.	Estimated Cost	February, 1921 No.	Estimated Cost
Allentown	34	$151,100	26	$33,075
Altoona	63	80,737	47	155,241
Atlantic City	224	439,262	161	143,443
Camden	48	294,855	46	72,345
Harrisburg	33	165,450	26	50,050
Lancaster	32	80,800	16	34,695
Philadelphia	1,242	5,381,435	715	1,345,170
Reading	148	221,551	154	60,600
Scranton	37	116,430	20	47,473
Trenton	45	67,920	79	79,335
Wilkes-Barre	66	247,898	29	35,774
Williamsport	33	47,550	18	29,325
Wilmington	47	951,770	54	47,101
York	29	28,580	39	19,525
Totals	2,081	$8,275,338	1,430	$2,153,153

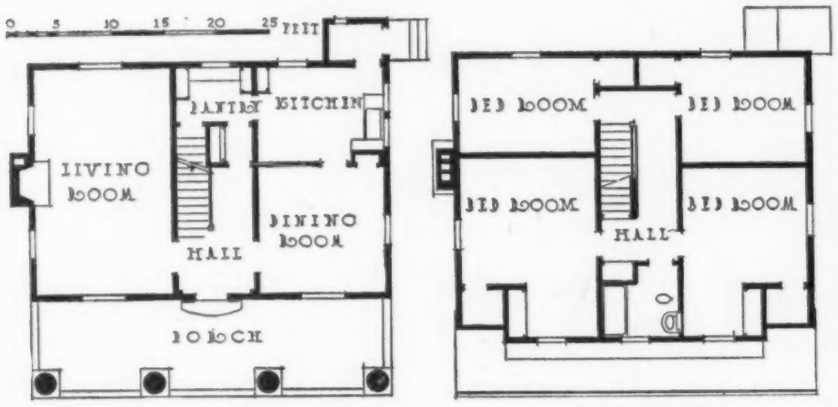
Although these factors affecting construction are not altogether favorable, the large volume of building already contracted for this year is evidence of renewed confidence in the building situation. The total number of operations for which permits were issued in Philadelphia during January and February of this year exceeds that of any previous similar period. In other parts of the district also, especially in southern New Jersey, a revival in building is already manifest. The table showing permits issued in the 14 principal cities of the district is evidence of this improvement in building.

A FILING SYSTEM FOR ARCHITECTS' OFFICES

THE American Institute of Architects has recently issued its Document No. 172 which is a complete outline of a standard construction classification and filing system for architects' offices, together with descriptions as to its use.

Architects to whom this question of filing has presented difficulties will do well to write to the American Institute of Architects, Octagon Building, Washington, asking for this document and for the printed proceedings of the Joint Conference on "Better Advertising to Architects," which was held at Indianapolis in November of last year.

Actual Monthly Estimates on Typical Small House



Floor Plans and Elevation of Typical House on Which Estimates Are Based

COST OF HOUSE

(Cubage, 27,150 ft.)

April 1, 1922 Total	Per cu. ft.	March 1, 1922 Total	Per cu. ft.
Baltimore			
$9,569.21	$0.352	$9,569.21	$0.352
Boston			
10,729.65	.395	11,218.63	.413
San Francisco			
10,849.63	.399	10,849.63	.399
St. Paul			
9,430.00	.347		

The cubage of the building is figured from the first floor area exclusive of porches and a height measured from 6 ins. below cellar floor to half point of gable, to which is added cubage of kitchen entry and half the cubage of porch, taking height from footings to plate of dormer.

WE have submitted working drawings of this house, together with a quantity survey of materials, to a representative contractor in each of the cities named, and have secured bona fide estimates which are tabulated below. Specifications are in accord with good practice in the several localities as found in houses of this size built under the supervision of architects. The figures are for the cost complete, including contractor's overhead and 10 per cent profit, but excluding architect's fee.

The house has been figured in each locality with concrete foundation walls, wood frame, using 2 x 4 wall and partition studs, 2 x 9 floor joists and 2 x 6 rafters. Exterior finish of lower story is back-plastered stucco on metal lath and of large shingles laid 10 ins. to weather on upper story and gables. Roof is covered with slate equal in value to non-fading sea green Vermont slate. Porch columns and chimney are stucco covered; porch floor of selected common brick laid basket pattern, in sand.

Windows and interior doors are of good grade, selected from stock, exterior and interior finish made to detail, inside trim being 4½-in. moulded stock with mitered joints. The living room has a pilastered wall and beamed ceiling treatment, and kitchen, pantry, dining room and bedrooms are fitted with cupboards and closets. First floor rooms are floored with straight-grained oak, and bedrooms with comb-grained yellow pine. These items are allowed in each estimate: plumbing fixtures, $175; lighting fixtures, $175; hardware, $150.

SERVICE SECTION
of THE ARCHITECTURAL FORUM

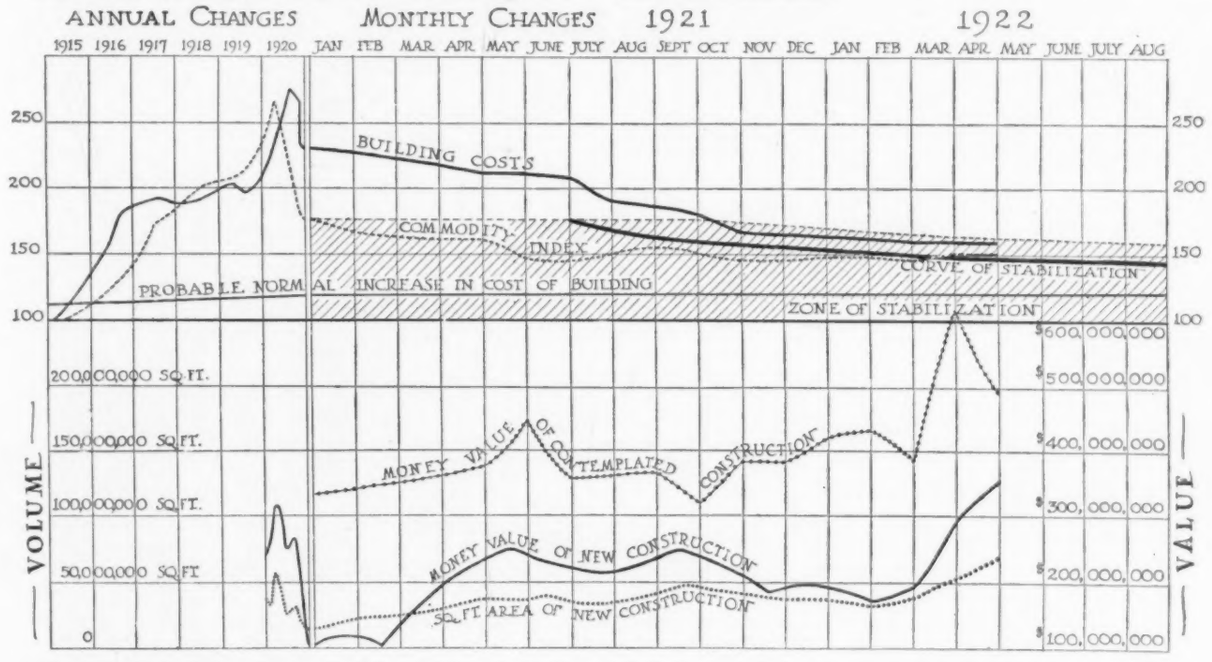
Information on economic aspects of construction and direct service for architects on subjects allied to building, through members of THE FORUM Consultation Committee

The Building Situation

A GLANCE at the chart shown below indicates that a real building boom is under way. Last month, commenting on the unusual volume of construction in March, we pointed out the fact that there were encouraging signs of still greater activity, particularly if the tendency to take profits on volume of business were continued.

It is interesting to note that the month of April has shown greater building construction activity than any month for many years. While part of this activity is of course seasonal in nature, it is quite evident that the basic trend in the building field is tending toward the supplying of normal demand and appreciable contribution toward making up the shortage which has developed in various classes of buildings during the past few years. As might be expected, the residential field is contributing a strong quota of the volume of new construction. The industrial field is also showing more activity than might have been previously expected.

A general survey of conditions in architects' offices indicates an increased activity which promises to hold up the volume of building construction on a comparatively higher level during the balance of this year and the early part of 1923. Many large building projects which have been held up for two or three years are now being rapidly developed into the contract stage. The cost of building is to be watched with great interest during the next few months. Any sharp upturn of the cost index at this time would be fatal to encouraging development of the volume of new construction. The confidence of investors in new buildings has returned definitely, but it could easily be shaken by an unexpected increase in material or labor costs. The summer months will probably show some decline in building volume, in accordance with the usual seasonal conditions.

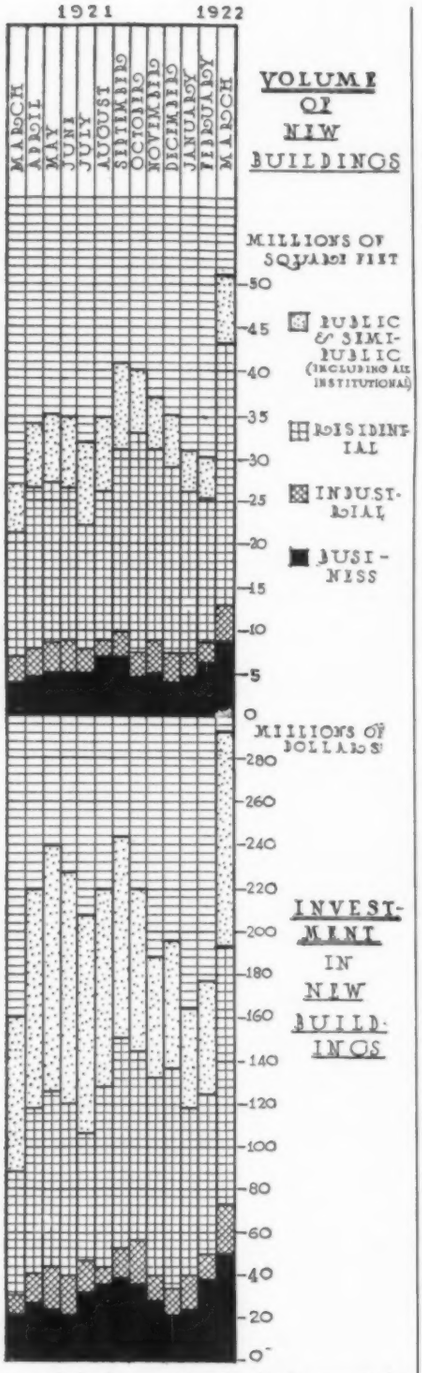


THIS chart is presented monthly with trend lines extended to the most recent date of available information. Its purpose is to show actual changes in the cost of building construction and the effect upon new building volume and investment as the *index line of building cost* approaches or recedes from the "curve of stabilization."

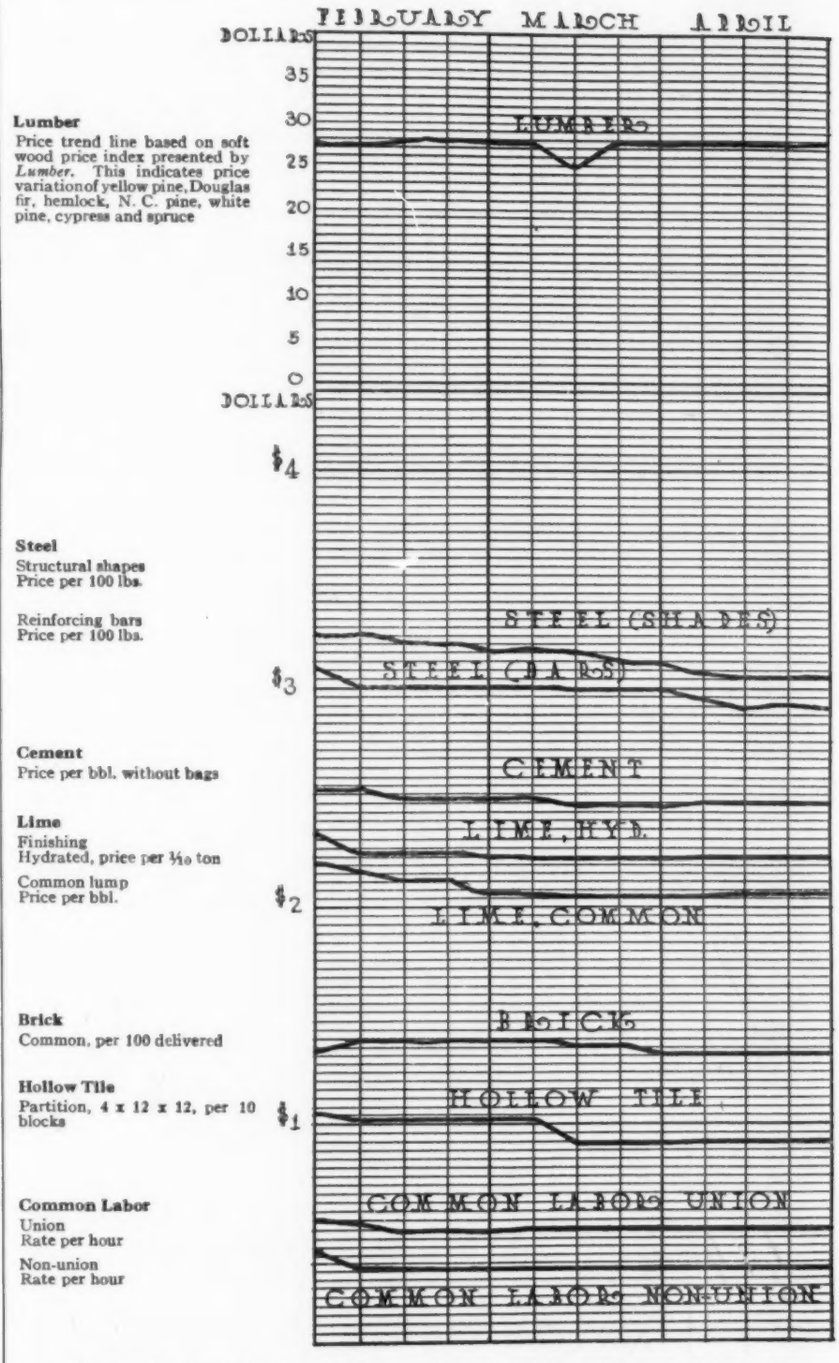
The CURVE OF STABILIZATION represents the building cost line at which investors in this field may be expected to build without fear of too great shrinkage in the reproduction value or income value of new buildings. The index line representing actual cost of building entered the ZONE OF STABILIZATION in the fall of 1921. If this cost line passes *out* of the zone of stabilization, building volume will decrease materially.

The degree of the curve of stabilization is based on (a) an analysis of time involved in return to normal conditions after the civil war and that of 1812; (b) the effect of economic control exercised by the Federal Reserve Bank in accelerating this return after the recent war, and (c) an estimate of the probable normal increase in building cost.

Factors of Fluctuation in Building Costs



Analysis of new construction showing comparative importance of major building types in volume and investment.



Lumber
Price trend line based on soft wood price index presented by *Lumber*. This indicates price variation of yellow pine, Douglas fir, hemlock, N. C. pine, white pine, cypress and spruce

Steel
Structural shapes
Price per 100 lbs.

Reinforcing bars
Price per 100 lbs.

Cement
Price per bbl. without bags

Lime
Finishing
Hydrated, price per 1/10 ton

Common lump
Price per bbl.

Brick
Common, per 100 delivered

Hollow Tile
Partition, 4 x 12 x 12, per 10 blocks

Common Labor
Union
Rate per hour

Non-union
Rate per hour

Figures used in developing all trend lines represent average prices to contractors in following cities: New York, Chicago, Denver, Seattle, Minneapolis, Atlanta, Dallas and San Francisco

THE graphic chart at the right is presented for the purpose of showing fluctuations in a number of important building materials and in labor costs. These fluctuations cover a period of three months and are shown in each issue of the Service Section in order to make possible at least a partial analysis of the building cost trend line shown on the preceding page.

The material market during April has remained quite steady, showing no unexpected changes and no variation worthy of comment. The influence of material and labor prices is indicated by the fact that the cost index line on the preceding page remains stationary for April as compared with March. In view of the unusual volume of building activity which has developed in March and April, it is encouraging to find the basic factors in construction cost remaining stabilized, and it is to be hoped that there will be no material increase because of demand.

It is quite true that in many of the producing industries of the building field extensive stocks have not been maintained, but at points where a change might be expected because of depleted stocks there is to be found a concerted effort toward rapid production which will probably offset higher costs.

Manufacturers everywhere are seriously attempting to encourage and maintain this newly developed building activity by holding down prices.

BUILDING MATERIAL PRICES

Table Showing Average Prices Paid by Contractors for Building Materials at Local Distributing Points as of Apr. 1, 1922. Prepared by Division of Building and Housing of the Department of Commerce from Prices Secured through the Bureau of Census

Commodity	Size or Condition	Unit	Mass. Fitchburg	Mass. Haverhill	N. Y. Buffalo	Penn. Pittsburgh	Penn. Erie	W. Va. Fairmont	S. C. Columbia	Fla. Tampa	Detroit	Mich. Pontiac	Saginaw	Wis. Milwaukee	Minn. Duluth	Cedar Rapids	Iowa Waterloo	Council Bluffs	Des Moines	Mo. St. Louis
Common Brick		1,000	*$21.00	$20.00	$17.12	$16.00	$15.75	$21.00	$10.50	$13.65	$16.50	$14.40	$12.00	*$12.50	$14.50	$14.30	$14.90	$17.50	$17.00	.....
Portland Cement	Excl. of containers	Bbl	*2.65	2.90	2.36	2.35	3.00	2.30	2.90	3.30	2.85	2.29	2.10	*2.45	2.40	2.21	2.43	2.32	2.06	*2.60
Yellow Pine No. 1	Dimension 2x4-16' S1S1E	M	*60.00	56.00	32.00	47.00	.....	35.00	.....	26.00	40.50	36.00	45.00	*35.00	.....	41.00	38.00	40.50	38.00	*36.50
Douglas Fir No. 1	Dimension 2x4-16' S1S1E	M	.....	.....	.....	.....	.....	.....	.....	.....	40.50	.....	47.00	*38.00	35.00	.....	38.00	39.50	38.00	*36.50
N. Carolina Pine No. 1	Dimension 2x4-16' S1S1E	M	*55.00	.....	.....	.....	.....	33.00	17.00	.....	40.50	36.00	.....	.....	.....	.....	.....	.....	.....	.....
Common Boards No. 1	1x6	M	*40.00	36.00	29.50	45.00	.....	33.00	20.00	36.00	.....	40.00	37.50	*32.00	35.00	35.00	34.50	38.00	40.00	*41.00
Y. P. Flooring E.G."C"	1x4-10'-16'	M	.....	56.00	.....	78.00	.....	63.00	55.00	.....	.....	51.00	60.00	.....	85.00	86.00	94.00	100.00	70.00	*51.00
Douglas Fir V.G. No. 2	1x4-10'-16'	M	.....	.....	.....	.....	.....	.....	.....	.....	67.50	.....	63.00	.....	75.00	91.00	94.00	100.00	.....	.....
Red Cedar Shingles	Extra clear 16" 5 to 2	100 sq. ft.	*8.50	6.00	5.70	4.68	5.50	5.00	5.00	.....	4.53	5.75	5.00	*5.50	5.50	6.00	7.50	6.50	6.75	*5.65
Cypress Shingles	Extra clear 16" 5 to 2	100 sq. ft.	.....	.....	.....	.....	7.00	.....	4.50	4.90	.....	.....	.....	*5.50	.....	.....	9.00	.....	.....	.....
Composition Shingles	Crushed slate surfaced	100 sq. ft.	.....	6.00	.....	.....	7.00	*7.00	5.85	7.50	.....	5.70	6.50	*6.50	6.00	5.75	8.00	8.25	7.50	*6.10
Gypsum Plaster Board	⅜"	1,000 sq. ft.	.....	46.00	45.00	37.50	50.00	25.05	32.00	40.00	30.00	.....	32.00	*32.00	43.00	40.00	.....	.....	46.00	*42.00
Lime	Hyd. Com.	Ton	*20.00	19.00	18.00	20.00	19.00	13.10	19.00	14.80	15.20	13.70	18.00	*15.00	.....	16.00	.....	.....	28.00	.....
Building Sand		Cu. yd.	*2.00	2.50	1.28	2.50	2.50	4.39	.95	1.65	2.50	1.50	2.00	*1.50	1.25	.90	1.50	2.43	1.80	*2.65
Crushed Stone	¾"	Cu. yd.	*3.25	3.00	1.62	6.87	3.00	4.50	3.60	4.50	3.50	1.48	3.00	*3.00	2.60	2.03	3.00	3.60	3.25	.....
Window Glass	Single A 10"x12"	50 sq. ft.	*4.75	3.60	3.90	2.80	.....	4.20	4.00	.....	3.60	.....	5.40	.....	5.00	.....	7.00	.....	5.00	*4.50
Hollow Tile	8"x12"x12"	Each	*.20	.24	.19	.19	.18	.14	.14	.18	.....	.17	.15	*.13	.....	.12	.13	.....	.15	.....
Cast Iron Pipe	4" E.H. 13 lbs. per ft.	Ton	.....	.....	58.80	51.68	.....	43.00	.....	.....	53.00	52.00	45.00	.....	50.40	.....	45.00	.....	.....	.....
Steel Pipe	1" galv.	100 ft.	.....	9.00	10.00	7.82	.....	7.50	9.00	10.15	.....	8.50	8.75	.....	9.30	9.61	9.57	.....	10.38	.....
Reinforcement Bars	¼" square	100 lbs.	*2.50	.....	.....	2.27	.....	2.00	3.20	2.50	2.60	2.40	2.85	*2.25	.....	2.50	2.10	3.05	2.56	.....
Structural Steel	Fab. 6" I-beams	100 lbs.	*3.25	4.00	2.30	2.10	.....	3.00	3.50	3.50	3.50	.....	3.00	*3.25	3.25	4.00	3.20	3.45	2.84	.....
Gypsum Plaster	Neat	Ton	.....	21.00	13.50	22.00	24.00	14.00	16.90	22.50	19.00	13.90	15.00	*17.00	21.50	14.20	13.60	17.50	*18.90	*18.50
Roofing Slate	No. 1 Ribbon	100 sq. ft.	.....	.....	8.00	13.50	.....	11.50	12.00	19.00	.....	17.10	.....	.....	.....	.....	22.00	.....	23.00	.....
Tar Paper, Roofing	2-ply 75 lbs. per roll of	100 sq. ft.	*2.75	2.25	2.00	1.95	2.15	.....	2.15	2.50	.....	2.75	2.75	.....	2.75	.....	2.45	2.90	2.85	.....
Rosin Sized Sheathing	3-ply 30 lbs. per roll of	500 sq. ft.	.....	1.50	1.00	1.35	.85	.85	1.00	1.25	.....	1.00	.....	.....	1.00	1.10	1.47	1.40	1.50	*.80

*F.O.B. job

Commodity	Size or Condition	Unit	Mo. Kansas City	Ill. Chicago	Ohio Cleveland	Ohio Akron	Ohio Warren	Ohio Dayton	Ohio Cincinnati	Ohio Toledo	Md. Baltimore	Ariz. Tucson	Ark. Little Rock	La. New Orleans	La. Shreveport	Texas San Antonio	Wash. Spokane	S. D. Sioux Falls	California Pasadena	California San Francisco
Common Brick		1,000	$16.00	$11.00	*$16.00	*$12.75	$15.90*	$16.50	$18.00	$12.00	*$17.00	$10.00	$12.50	$11.00	$1600	$16.00	$15.00	*$17.60	*$17.00	$15.50
Portland Cement	Excl. of containers	Bbl.	.....	1.87	*2.64	*2.76	2.36	*2.77	2.40	2.20	2.80	4.60	3.70	2.55	3.80	3.00	2.90	*2.63	*3.25	2.55
Yellow Pine No. 1	Dimension 2x4-16' S1S1E	M	41.50	37.00	*48.00	*40.00	48.00	*45.00	38.00	43.00	.....	.....	30.00	.....	41.00	45.00	.....	.....	.....	.....
Douglas Fir No. 1	Dimension 2x4-16' S1S1E	M	41.50	.....	.....	.....	.....	.....	.....	.....	.....	50.00	.....	.....	.....	.....	.....	*37.00	*48.00	30.00
N. Carolina Pine No. 1	Dimension 2x4-16' S1S1E	M	.....	.....	.....	.....	48.00	*45.00	.....	.....	32.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
Common Boards No. 1	1x6	M	45.00	31.00	*56.00	*40.00	45.00	.....	60.00	60.00	35.00	57.50	32.00	40.00	44.00	48.00	.....	*35.00	*49.00	28.00
Y. P. Flooring E.G."C"	1x4-10'-16'	M	78.00	.....	*84.00	*70.00	65.00	*65.00	.....	59.00	50.00	.....	45.00	.....	74.00	75.00	.....	.....	.....	.....
Douglas Fir V.G. No. 2	1x4-10'-16'	M	62.50	.....	.....	.....	70.00	*85.00	.....	.....	.....	92.50	.....	.....	.....	.....	70.00	*84.00	*85.00	65.00
Red Cedar Shingles	Extra clear 16" 5 to 2	100 sq. ft.	6.00	.....	*5.04	*6.50	5.60	*5.50	4.50	6.75	.....	6.00	4.75	.....	6.10	7.00	2.88	.....	*5.85	5.00
Cypress Shingles	Extra clear 16" 5 to 2	100 sq. ft.	.....	.....	.....	.....	7.50	*6.50	.....	5.75	5.75	.....	4.50	5.50	7.20	.....	.....	7.50	.....	.....
Composition Shingles	Crushed slate surfaced	100 sq. ft.	5.00	.....	.....	.....	.....	.....	.....	.....	6.50	.....	6.50	.....	7.75	.....	.....	.....	.....	.....
Gypsum Plaster Board	⅜"	1,000 sq. ft.	52.50	.....	*53.00	*47.50	45.00	*32.50	.....	34.85	35.00	55.00	35.00	40.00	34.00	52.00	55.00	32.00	*50.00	40.00
Lime	Hyd. Com.	Ton	24.00	14.70	*14.00	*17.00	13.10	*14.00	12.50	13.70	17.20	.....	24.00	14.00	27.50	22.50	18.50	22.50	*28.00	22.00
Building Sand		Cu. yd.	2.35	2.25	*2.50	*2.22	2.16	*1.85	1.35	1.35	1.75	1.15	1.00	1.50	2.00	2.75	.....	.....	*1.75	1.50
Crushed Stone	¾"	Cu. yd.	3.00	2.25	*3.50	*4.06	.....	.....	1.75	2.19	2.76	3.00	2.00	2.70	5.00	2.60	.....	.....	*3.00	2.50
Window Glass	Single A 10"x12"	50 sq. ft.	4.50	.....	.....	*3.60	.....	*4.50	.....	.....	4.50	.....	5.00	.....	4.50	5.40	5.40	.....	.....	4.50
Hollow Tile	8"x12"x12"	Each	.22	.....	.....	*.12	.....	*.18	.13	.15	.18	.18	.20	.17	.19	.21	.10	.....	.....	.18
Cast Iron Pipe	4" E.H. 13 lbs. per ft.	Ton	.....	.....	.....	*62.62	.....	*65.00	.....	.....	37.95	.....	65.00	.....	77.00	59.00	.....	.....	.....	44.60
Steel Pipe	1" galv.	100 ft.	.....	.....	.....	8.36	.....	*8.57	.....	.....	7.55	9.95	11.00	.....	9.40	9.40	10.26	.....	.....	8.40
Reinforcement Bars	¼" square	100 lbs.	2.90	.....	.....	*2.75	.....	*2.50	.....	.....	2.40	4.75	3.25	3.00	3.60	3.75	3.50	.....	.....	2.75
Structural Steel	Fab. 6" I-beams	100 lbs.	3.75	.....	.....	.....	.....	*3.25	.....	.....	2.60	.....	3.50	4.25	4.00	.....	.....	.....	.....	3.65
Gypsum Plaster	Neat	Ton	15.50	.....	.....	*19.00	15.10	*19.00	15.20	13.50	.....	23.00	25.00	21.00	24.00	24.00	18.50	*18.00	21.00	14.80
Roofing Slate	No. 1 Ribbon	100 sq. ft.	.....	.....	.....	.....	.....	*16.50	.....	.....	.....	.....	16.00	.....	12.00	.....	.....	.....	.....	.....
Tar Paper, Roofing	2-ply 75 lbs. per roll of	100 sq. ft.	.....	.....	*2.50	.....	.....	*2.25	.....	1.75	.....	3.25	2.25	.....	2.25	2.58	2.75	.....	2.50	.....
Rosin Sized Sheathing	3-ply 30 lbs. per roll of	500 sq. ft.	1.20	.....	.....	.....	.....	*1.15	.....	.85	.95	1.35	1.20	.....	1.25	1.80	1.20	*1.15	.....	2.00

*F.O.B. job

Table of Cubic Foot Cost Figures

AVERAGES COMPILED FROM ACTUAL COSTS REPORTED BY ARCHITECTS AND BASED ON CONTRACTS LET DURING FEBRUARY, MARCH AND APRIL, 1922

Figures, Except Where Otherwise Noted, Include Usual Mechanical Equipment, But Not Architects' Fees

The Architectural Forum Assumes No Responsibility for the Accuracy of These Unit Costs Other Than Claiming That They Are True Averages of Figures Submitted

	N. E.	S. E.	N. W.	S. W.
Apartments (Non-elevator)				
5, 6-room suites	....	....	....	....
1 Fireproof steel frame	....	....	....	....
2 Reinforced concrete	....	....	....	....
3 2nd class	.365	....	.29	....
Apartments (Elevator)				
2, 3-room suites	....	....	....	....
1 Fireproof steel frame	.56	.58	.47	....
2 Reinforced concrete	....	....	.41	....
3 2nd class	.42	....	.37	....
Banks—Individual Buildings without fittings				
1 1st class	.525	....	.47	....
College Laboratories—Fireproof without equipment	.47	....	....	....
Factories—Fireproof				
1 One-story	.16	.15	....	.12
Factories—Fireproof				
1 Multi-story	.266	.12	.163	....
Factories—Mill Constr.				
1 Multi-story	.192	.09	.15	.14
Garages—Public, Fireproof				
1 1, 2-story with ramps	.246	.165	.23	....

	N. E.	S. E.	N. W.	S. W.
Garages—Public, Fireproof				
Multi-story	....	....	....	....
1 With elevators	....	....	.257	....
2 With ramps	....	....	.24	....
Hospitals—Pavilion Type				
1 1st class	....	....	.415	....
2 2nd class	....	....	.362	....
Hospitals—Block Type				
1 1st class	.524	.46	.466	....
2 2nd class	....	....	....	....
Hotels				
1 Steel frame fireproof	....	....	.52	....
2 Reinforced concrete	.546	.364	.383	....
3 2nd class	....	....	....	....
Houses, Suburban (under $15,000)				
1 Frame, wood siding	.311	.24	.267	.273
2 Frame, stucco	.32	.245	.337	.334
3 Frame, brick veneer	.39	.293	.36	.362
Houses, Suburban (under $50,000)				
1 Frame, wood siding	.42	....	.40	....
2 Frame, stucco	.423	....	.423	....
3 Frame, brick veneer	.43	....	....	....
4 Solid brick	.436	....	.44	.47
5 Tile and Stucco	.42	....	.43	....

	N. E.	S. E.	N. W.	S. W.
Loft Buildings				
1 Steel frame fireproof	.25	....	.247	....
2 Reinforced concrete	.215	....	.236	....
3 2nd class	.196	....	.20	....
Office Buildings (under 12 stories)				
1 Steel frame	....	....	.45	....
2 Reinforced concrete	....	....	.386	....
3 2nd class	....	....	....	....
Office Buildings (over 12 stories)				
1 Steel frame fireproof	.55	....	....	....
2 Reinforced concrete	....	....	....	....
Schools—One-story				
1 1st class	.371	....	....	....
2 2nd class	.30	....	.28	.198
Schools—Multi-story				
1 1st class	.414	.37	....	.364
2 2nd class	.318	....	.233	.201
Theaters—Fireproof (Full stage equipment)				
1 Two balconies	....	....	....	....
2 One balcony	....	....	....	....
Theaters—Motion Picture (Fireproof)				
1 No balcony	....	....	....	....
2 One balcony	....	....	....	....
Y. M. C. A. Buildings				
1 Fireproof	....	....	.356	....
2 2nd class	....	....	.30	....

Method of Cubing.—In requesting data we asked this method to be followed: Multiply area of the outside of the building at first floor level by the height of the building from 6 in. below the general basement floor to the mean height of the roof. Parapet walls, stacks, pent houses beyond the mean roof height, and balconies and other projections not contributing to the actual usable floor area are to be ignored. In residential work projecting porches are to be taken at 50% of their actual cubage, those within the bearing walls at full cubage, height is to be measured from footings to high point of roof. If portions of building are built to different heights each section should be figured as an individual unit.

The geographical divisions are made up as follows:

Northeast
States bounded by Canada on north, Mississippi River on west and Ohio River on south.

Northwest.
Includes states west of Mississippi and north of New Mexico.

Southeast
States include those bounded by Ohio River on north and Mississipp on the west.

Southwest
The states of Arizona, New Mexico, Oklahoma, Arkansas, Louisiana, Texas and Southern California.

THE FORUM CONSULTATION COMMITTEE

A group of nationally known experts on various technical subjects allied to building, providing a direct service to architects

THE editors of THE ARCHITECTURAL FORUM have been fortunate in obtaining the co-operation of the following recognized experts who constitute THE FORUM Consultation Committee. This Committee provides a service of the greatest value to subscribers in addition to the usual editorial service, and architects who seek information on specific questions in these various fields are invited to present inquiries.

The basis on which this Committee has been organized is:

(*a*) That each Committee member shall be a representative leader in his line;
(*b*) That no Committee member has affiliations with any manufacturer;
(*c*) That no Committee member will be called upon for detailed service except by special arrangement;
(*d*) That a special editorial article on a subject represented under each of the headings below shall be prepared during the year by the Committee member.

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WALTER STABLER
Comptroller, Metropolitan Life Insurance Co.

The largest institution in the United States making loans for building construction. Mr. Stabler's knowledge of building investments covers the country and is widely recognized.

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FREDERIC CULVER
President, Culver & Co., New York

A specialist in the financing and development of co-operative house projects. Mr. Culver has successfully developed approximately 25 million dollars' worth of co-operative apartment houses. He is an attorney and has had long experience in financing and construction of this nature.

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C. STANLEY TAYLOR

Widely experienced in real estate development and financing, real property law, architecture, engineering and building construction. Financial and Business Editor of THE ARCHITECTURAL FORUM.

FIRE PROTECTION ENGINEERING

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Specialist in insurance engineering as applied to building design, construction and equipment.

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J. CLYDESDALE CUSHMAN
President, Cushman & Wakefield, Inc., Real Estate, New York, Vice President, Building Managers and Owners' Association of New York

Mr. Cushman's firm has participated largely in the promotion and operation of many large New York buildings. His specialty is the management of office buildings.

HOTEL DESIGN AND EQUIPMENT

DANIEL P. RITCHEY

Known in the hotel field as the "hotel doctor." Mr. Ritchey, who is an engineer as well as an experienced hotel owner and manager, is qualified to answer any questions which may arise in this connection.

ELECTRICAL SCIENCE

WILLIAM L. GOODWIN
Assistant to the President and in charge of activities of the Society for Electrical Development

This Society is organized to promote accurate knowledge of the practical application of electricity. Its activities extend from the simple problems of household equipment to highly developed electrical plants. Particular attention is given the development of provision for electrical service in buildings.

GAS SERVICE AND UTILIZATION

NILS T. SELLMAN
Service Engineer, American Gas Association

A specialist in problems pertaining to gas service and its use in all classes of buildings and industries.

SAFETY ENGINEERING

S. J. WILLIAMS
Secretary and Chief Engineer, National Safety Council, Chicago

Safety engineering is an important factor in the design of buildings where large groups of people congregate. The National Safety Council has investigated construction and devices with the greatest minuteness.

FARM SCIENCE

FREDERICK WALTER IVES, B.S., M.E.

Professor and Head of Department of Agricultural Engineering, Ohio State University. Consulting Agricultural Engineer, Columbus, Ohio.

Specialist in land drainage, soil improvement, surveys, farm arrangement for economical production, purchase of equipment and economical layout of farm buildings with special reference to interior arrangement.

THE FORUM DIGEST

A SURVEY OF IMPORTANT CURRENT ARTICLES ON BUILDING ECONOMICS AND BUSINESS CONDITIONS AFFECTING CONSTRUCTION

The Editors of this Department select from a wide range of publications matter of definite interest to Architects which would otherwise be available only through laborious effort

BUILDING BUSINESS IS BOOMING

IN *Forbes* Magazine for May 13, Paul Clay, Staff Economist, says: "For the first time since 1916 the building business is actually booming. This is not a repetition of the spurious boom of 1919, for then all that happened was that costs were so high that building permits looked large, whereas the amount or quantity of construction work done was actually small. By reducing the figures to a quantity basis and calculating in square feet of floor space it was found by close observers that the building shortage was actually growing worse, and that the quantity of construction under way was only about 70 per cent of normal.

"Building costs have recently declined, while at the same time the total value of construction work in process has greatly increased. In July, 1919, the so-called boom of 1919–20 began. We here compare the permits of nearly 150 leading cities at that time with the permits of the present time:

BUILDING PERMITS

Month	1921-22	1919-20
July	$149,456,170	$137,450,093
August	158,877,799	158,918,965
September	152,996,301	137,584,119
October	169,972,460	150,169,685
November	145,158,370	138,925,791
December	139,170,180	143,976,268
January	140,517,763	126,126,080
February	135,452,000	111,065,718
March	234,288,294	151,846,777
April	.....	185,874,860
May	.....	129,339,929
June	.....	128,895,700

"Although the activity in 1919–20 did not begin until July, 1919, it terminated in April, 1920. During this whole period the maximum of permits was $185,874,860, whereas the permits of March, 1922, amounted to $234,288,294. Nor is this all that has happened; in addition to a great increase in the value of permits, there has been a great decrease in costs. A leading New York bank* recently calculated the elements in the cost of a two-story frame house which show that the increase in costs from 1914 to the peak of 1920 amounted to 31 per cent; the decrease from the peak to March, 1922, was about 26 per cent, and the present costs are about 71 per cent above the pre-war basis.

"If we calculate by an entirely different method, the conclusion is practically the same. One may just as readily compute upon the basis of the relative amounts of materials and labor which go into building operations and the price variations of each important item. The average pre-war consumption figured at the wholesale price at the source of production was about as follows, and these figures include all sorts of building operations:

Commodity	Quantity	Price	Value
Steel, tons	4,000,000	$30.00	$120,000,000
Cement, bbls.	85,000,000	0.90	76,500,000
Lumber, M. ft.	18,000,000	15.00	270,000,000
Glass	.....	....	123,000,000
Brick and stone	.....	....	130,000,000
Labor, men	225,000	1,000	225,000,000
			$944,500,000

"To be sure, this total of $944,500,000 is more than the pre-war building permits in leading cities amounted to in the typical year, although the costs referred to in the permits were figured, not at these wholesale prices at the sources of production, but rather at retail prices delivered. However, the permits in the small towns and rural districts are omitted from all the compilations, for lack of data, and these figures in the right hand column should indicate with fair reliability the relative importance of the various chief items of cost in the total building operations of the United States.

"Since labor costs have declined but little from the high peak, some of the index numbers purporting to show declines of 35 or 40 per cent in total building costs are doubtless erroneous.* The wholesale price movements of the above six items indicate a decline from 1920 to date of about 27 per cent in average building costs, and, therefore, agree substantially with the foregoing estimate. Steel has declined from $77 per ton in 1920 to $42 at the present time; window glass from $7.05 to $3.42, and cement per barrel from $4.35 to $1.70. Hudson River common brick have declined from $23.25 to $16.50, and even lumber prices have gone down moderately.

"Thus the upshot of the matter is that, taking all buildings together, present costs are equivalent to only about $2.77 per square foot of floor space as compared with $3.80 during the first half of 1920 and $3.50 during the second half of 1919. That is why, in April, 1920, the $185,874,860 of permits represented a floor space of only 48,920,000 square feet, whereas the $234,288,294 of permits issued this present March represents approximately 84,510,000 square feet of space. There is not so very much difference in the value of the permits, but actual building operations are approximately 70 per cent greater than they were at the peak of the 1920 boom.

"In still another way the vast improvement in the building situation may be visualized. Normally we would build about 600,000,000 feet of floor space per annum, and this includes dwellings, governmental buildings, factories, lofts, office buildings, and all others. In 1912 the estimated quantity of construction was 630,430,000 square feet, and in 1914 it was 575,400,000. To keep pace with the growth of wealth and population, however, we ought this year to build about 700,000,000 square feet of floor space, and if general business were fully up to normal this would merely cover ordinary requirements without making up any part of the deficiency."

*See detail of this compilation on p. 65.

*Relative labor efficiency is not taken into consideration in Mr. Clay's analysis and if this could be measured present reductions would appear greater. —EDITOR

$100,000,000 FOR NEW BUILDING LOANS

S. W. STRAUS & CO., large lenders of money for new buildings, are reported in the *Bulletin of the National Federation of Construction Industries* to say with regard to the building situation:

"There is a good demand for funds to carry on new building operations. The general fundamental conditions in the situation are now so nearly normal that since January 1 we have underwritten building loans amounting to $43,980,000 of which $26,510,000 was for apartment houses, $12,350,000 for office and loft buildings, and $5,120,000 for miscellaneous structures. If the demand continues at the same rate, and fundamental conditions seem to so indicate, we shall be in a position to loan approximately $100,000,000 more to finance new building construction during the balance of the present year.

"That the present encouraging conditions are nationwide in character is indicated by the widely scattered range of these financial underwritings which include loans in 14 cities and 13 states: New York, Chicago, Philadelphia, Boston, Atlanta, Detroit, Fort Worth, Cleveland, Birmingham, Dallas, San Francisco, Kansas City, Seattle and Portland, Oregon."

WHAT AND WHY WE BUILD

A SUMMARY of an elaborate analysis of the building permits issued by United States cities in 1920, just completed by the Bureau of Labor Statistics, is published in *Index*, issued by the Associated General Contractors. This analysis shows how the sum of $1,204,000,000 expended in 196 cities in 1920 was distributed among 13 classes of buildings.

Of this sum, 37 per cent was expended for residential building, mostly houses, but including apartments, clubs, hotels

Dr. Gries sums up some of the advan- opportunties for mistakes. Misunder- COST DISTRIBUTION ON

and boarding houses. A little more than one-quarter was spent for wooden buildings and almost three-quarters on buildings which have some fire-resisting qualities. Brick and hollow tile buildings comprise much the largest group, consuming 43 per cent of the total expenditure. Wooden buildings come in second place and steel skeleton buildings next, with concrete a good fourth.

An analysis of the residential construction and the number of families accommodated by it shows that the average one-family house cost $4,320 and the multi-family house cost $3,165 per family, with the two-family house about midway between these two figures. Considering that these houses were built in the high cost year of 1920, it seems surprising that the average cost should be so low.

An interesting point developed by the survey is that almost two-thirds of the families provided for will be accommodated in one-family houses.

Dwellings Authorized by Permits Issued in 196 Cities in 1920

Kind of Dwelling	No. of buildings	Estimated number of families	Cost per family
One-family houses	68,637	68,637	$4,320
Two-family houses	5,402	10,804	3,720
One- or two-family houses with stores	846	1,574	5,624
Multi-family houses	1,496	20,946	3,165
Multi-family houses with stores	239	894	4,169
Total (Average)	76,620	102,855	4,036

Over 208,000 buildings of all kinds are provided for in these permits; 93,000 buildings, or 45 per cent of the total, are garages. This compares with the total of all kinds of dwelling houses of 76,620. This great preponderance of garages among the new buildings may seem surprising until we reflect that it means only one garage for each 13 automobiles added to the registration list in 1921.

Buildings Authorized by Permits Issued in 196 Cities in 1920, Classified by Number of Each Kind

Kind of Buildings	Number of buildings	Per cent of total
Garages	93,121	44.73
One-family houses	68,637	32.97
Sheds, stables and barns	13,160	6.32
Miscellaneous	9,253	4.44
Stores, etc.	6,737	3.24
Two-family houses	5,402	2.59
Factories and workshops	5,381	2.58
Multi-family houses	1,496	.72
Office buildings	1,102	.53
Gasolene service stations	853	.41
One- or two-family houses with stores	846	.40
Schools	547	.26
Churches	527	.25
Amusement places	426	.20
Multi-family houses with stores	239	.11
Public buildings	191	.09
Hotels	101	.05
Hospitals	91	.04
Clubs	54	.03
Lodging houses	38	.02
Total	208,202	

INTERESTING COST COMPARISON OF DWELLING CONSTRUCTION

THE interesting information given here regarding the cost of home building has recently been presented through the *Chemical Bulletin* which is issued from time to time by the Chemical National Bank of New York.

These detailed figures present a comparison of the cost of building a home in 1914 with the cost of the same building in 1920, at the peak of the high price wave, and in March, 1922. The figures are for three different types of residences, showing in each case the changes in the various elements in labor and material costs.

A home of type A cost in 1914, $5,529. In 1920 the same house cost $12,815, an increase of 131% in relation to the 1914 figure. In March, 1922, such a house would cost $9,502, 71% more than the 1914 cost, and 26% below the maximum cost in 1920.

TYPE A
2-STORY FRAME HOUSE
7 Rooms—Size 30′ x 34′
Contents 29,100 cu. ft.—Fl. Area 2,640 sq. ft.

	1914	(Peak) 1920	March 1922
Excavation	$240.00	$420.00	$420.00
Foundations and cement	470.00	1,459.00	1,167.00
Masonry	250.00	667.00	543.00
Plastering	359.00	962.00	809.00
Carpentry and glass	2,520.00	5,629.00	3,845.00
Painting	320.00	608.00	560.00
Plumbing and gas	350.00	686.00	517.00
Heating	400.00	1,029.00	712.00
Metal work	180.00	455.00	291.00
Tile work	40.00	87.00	54.00
Mantels	80.00	173.00	109.00
Electric	250.00	500.00	377.00
Hardware	70.00	140.00	98.00
Total cost	$5,529.00	$12,815.00	$9,502.00
Cost per cu. ft.	$0.19	$0.44	$0.325
Cost per sq. ft.	2.09	4.85	3.60
Per cent of change	100%	231%	171%

The cost of a home of type B in 1914 was $4,176. To build such a house in 1920 cost $9,767, 133% above 1914 costs. The present cost of this home is $7,374, which is 76% above 1914 prices and 24% below the maximum cost.

TYPE B
2-STORY COLONIAL HOUSE
8 Rooms (Including 2 Attic Rooms)—Size 23′ x 41′
Contents 25,315 cu. ft.—Fl. Area 2,530 sq. ft.

	1914	(Peak) 1920	March 1922
Total cost	$4,176.00	$9,767.00	$7,374.00
Cost per cu. ft.	$0.165	$0.385	$0.29
Cost per sq. ft.	1.65	3.86	2.91
Per cent of change	100%	233%	176%

The 1914 cost of a type C home was $4,701, which by 1920 had risen to $10,913, a figure 132% above the earlier cost. The cost of erecting this house in March, 1922, is $8,112, 72% above the 1914 cost and 26% below the peak cost.

TYPE C
2-STORY SHINGLE HOUSE
8 Rooms (Small)—Size 26′ x 35′
Contents 24,360 cu. ft.—Fl. Area 2,385 sq. ft.

	1914	(Peak) 1920	March 1922
Total cost	$4,701.00	$10,913.00	$8,112.00
Cost per cu. ft.	$0.193	$0.448	$0.333
Cost per sq. ft.	2.00	4.64	3.68
Per cent of change	100%	232%	172%

The rise in prices and wage increases between 1914 and 1920 more than doubled building costs between those two dates. The subsequent decline, while not sufficient to restore costs to the old level, has brought about a very material decrease in construction costs, the fall in costs in two years amounting to 25% of costs at the peak.

The prospective builder is, of course, interested in knowing whether he may look for further declines, for which he should wait. It would be beyond the scope of this article to attempt to forecast the course of building costs in the future. General wholesale prices, as measured by the index number of the United States Bureau of Labor Statistics, seem to be stabilized at a level about 50% above that of the pre-war period. Building costs are above this level, but many of the elements which bulk large in building costs, such as freight rates and wage rates, are less susceptible to downward revision than are commodity prices in general. The general housing shortage and the increasing volume of building at present price levels are factors which serve to strengthen building material prices. While it is entirely possible, therefore, that building costs may decline still further, it is not probable that drastic declines will occur.

THE DEVELOPING IDEA OF STANDARDIZATION IN BUILDING CONSTRUCTION

ARCHITECTS will undoubtedly be interested in the rapid progress on concerted efforts now being made in the construction industry tending to the elimination of waste. These extracts from a recent address by John M. Gries (Chief of the Division of Housing and Building, U. S. Dept. of Commerce) indicate some of the possibilities of saving in construction cost through standardization:

"It is possible that a smaller number of sizes of pipes, drain tile, hollow building tile, glazed tile, the fittings, doors, locks and other items of hardware, be produced. Just how far it is advisable or advantageous to go in the direction of the elimination of variety, I am unable to say and I believe few manufacturers or builders are now in a position to answer the question. It is time, however, that a study be made with the co-operation of all groups interested in construction to determine how far fewer dimensions should be produced, fewer varieties placed on the market without curtailing or without hindering the initiative of the individual in making intelligent progress and advancement. There will always be room for a large number of varieties in the more expensive construction, especially in the items which may be classed as style goods.

"There was a day when random width and random length of flooring prevailed. Today we have relatively few widths. Who brought about this change? I do not know just who contributed most, but I do know that the construction industry played a very important part. On every hand we find that progress is being made. I do not insist that greater standardization is desirable in every field. All that I contend is that a study should be made and that where the findings justify it, a reduction in the sizes should follow."

Dr. Gries sums up some of the advantages of standardization in these words:

(1) Reduces investment in plant equipment of manufacturers. Fewer different machines will be needed and less floor space will be required.

(2) Reduces the intermittence in employment and irons out the peaks of production.

(3) The manufacturer can better judge the demands for the season and thus produce largely for stock. Manufacturing to order will be reduced.

(4) By manufacturing largely for stock labor can be employed more steadily and the labor turnover reduced, resulting in more efficient workmen.

(5) The manufacturer need no longer be equipped to take care of the high seasonal peak as the power company must now be equipped. Production costs are usually less where they are relatively constant.

(6) Laborers will be more efficient, for they have fewer sizes and designs to work with, and as steady employes they produce more than they do where the labor turnover is high. They not only produce more but make a better product.

(7) Fewer sizes and styles make shipments more prompt, reduce the number of unexpected shortages in stock which often upset the plans for the day or week, and reduce the cost of taking inventory and result in fewer errors.

(8) There are fewer items to record on the invoices, less clerical work and fewer opportunties for mistakes. Misunderstandings will be few.

(9) The smaller the number of designs the more carefully these designs can be worked out, resulting either in better designs, lower costs, or both.

(10) The building material dealer need not carry such a large stock of specialties and can do more business in the same sized yard or store. He will not have capital tied up in slow-moving or dead stock.

(11) With fewer sizes and shapes the dealer can order earlier in the season and avoid transportation difficulties.

(12) Litigation will be reduced, with a reduction in the varieties and in carefully described qualities.

(13) More uniformity in specifications, purchase orders and contracts will also eliminate more misunderstanding and resulting litigation.

(14) The builder will be able to estimate, order, buy and handle with less difficulty.

(15) The building trades laborers will be more efficient, for they do not have to know how to handle to advantage thousands of different sizes and shapes.

(16) Building owners will gain from being able to use stock materials in maintenance and alteration work.

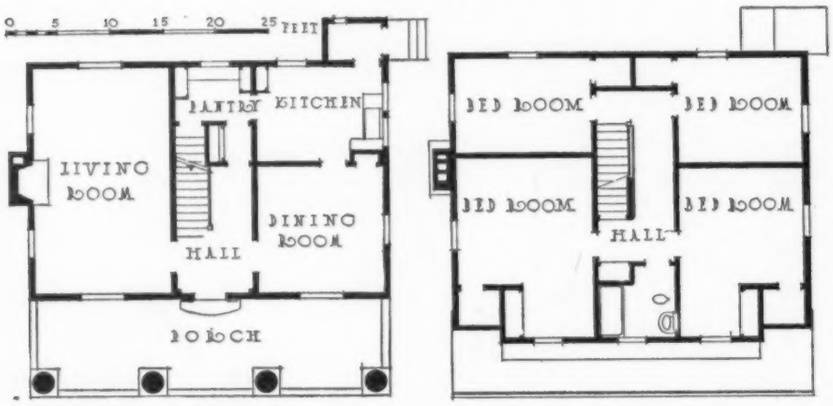
(17) The public, too, will gain from the economies brought about in the construction industry, and with public advantage the volume of business falling to the construction industry will be greater.

COST DISTRIBUTION ON DWELLING CONSTRUCTION

ENGINEERING NEWS-RECORD presents this interesting cost tabulation computed by The Cleveland Housing Co. from costs of more than 100 five- and six-room frame dwellings built during 1920 and 1921 in Cleveland. W. W. Dibrell, superintendent of construction for the company, calls attention to the fact that the masonry and carpentry items are noticeably higher in 1921 than in 1920, despite the wage cuts in the building crafts early in 1921. Mr. Dibrell says: "This is accounted for by the severe letting up of work early in 1921 and the fact that sub-contractors, keen for new work, bid on small margins.

	1920			1921		
Trade	Total per cent	Per cent material	Per cent labor	Total per cent	Per cent material	Per cent labor
Excavating	2.8	....	2.8	2.3	....	2.3
Masonry...	11.4	7.4	4.0	13.8	8.6	5.2
Carpentry..	46.0	25.0	21.0	50.0	28.0	22.0
Roofing....	1.4	.9	.5	1.4	.8	.6
Plaster.....	8.5	4.1	4.4	6.6	2.6	4.0
Painting...	5.0	1.4	3.6	4.8	1.3	3.5
Plumbing..	13.6	11.8	1.8	10.4	9.0	1.4
Electrical work....	2.8	2.3	.5	1.8	1.4	.4
Heating....	3.4	2.5	.9	2.9	2.1	.8
Sheet metal	.8	.5	.3	1.3	1.2	.1
Decorating.	1.3	.3	1.0	1.2	1.0	.2
Miscellaneous	3.0	2.7	.3	3.5	3.0	.5
Total....	100.0	58.9	41.1	100.0	59.0	41.0

Actual Monthly Estimates on Typical Small House



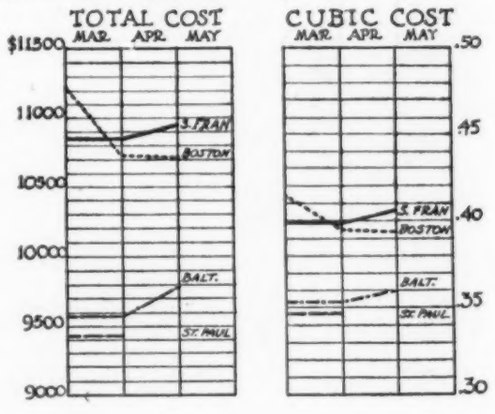
Floor Plans and Elevation of Typical House on Which Estimates Are Based

WE have submitted working drawings of this house, together with a quantity survey of materials, to a representative contractor in each of the cities named, and have secured bona fide estimates which are tabulated below. Specifications are in accord with good practice in the several localities as found in houses of this size built under the supervision of architects. The figures are for the cost complete, including contractor's overhead and 10 per cent profit, but excluding architect's fee.

The cubage of the building is figured from the first floor area exclusive of porches and a height measured from 6 ins. below cellar floor to half point of gable, to which is added cubage of kitchen entry and half the cubage of porch, taking height from footings to plate of dormer.

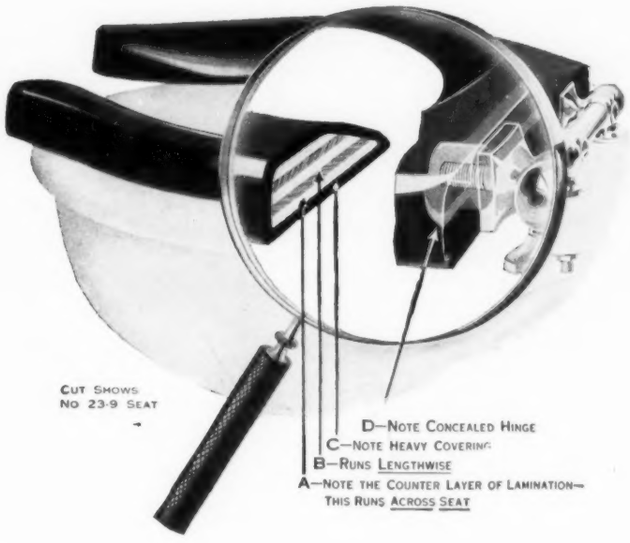
COST OF HOUSE (Cubage, 27,150 ft.)

	Apr.	May
Baltimore	9569.21	9785.21
Cubic Ft.	.352	.36
Boston	10729.65	10712.64
Cubic Ft.	.395	.394
San Francisco	10849.63	10949.63
Cubic Ft.	.399	.406
St. Paul	9430.00	
Cubic Ft.	.347	



Manufacturers' Catalogs and Business Announcements

THE BRUNSWICK-BALKE-COLLENDER CO.
WHALE-BONE-ITE
REG. PAT. OFFICE
CLOSET SEATS



THE MUNICIPAL PIER, CHICAGO, is equipped with 238 Whale-Bone-Ite Seats

The variable conditions in connection with this installation demonstrate *Whale-Bone-Ite Efficiency.*
Thousands use these seats eight months of the year.

STUDY that construction and you will order

Whale-Bone-Ite Guaranteed against splitting
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Impervious and acid proof

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First cost—last cost
Note *patented* fool-proof *hinges.*

SOLD BY ALL LEADING PLUMBERS AND JOBBERS

MADE BY

THE BRUNSWICK-BALKE-COLLENDER CO.
623 SO. WABASH AVE. CHICAGO

Manufacturers' Catalogs and Business Announcements

CATALOG REVIEW

AMERICAN SHEET AND TIN PLATE CO., Frick Building, Pittsburgh. "Better Buildings" (8½ x 11 ins.), 30 pp.

Progressive architects and builders are ever searching for better and more economical building materials. As timber becomes scarcer and masonry in all its various branches more costly, the tendency is to turn to the use of other materials which offer the advantage of moderate cost while still possessing the wearing qualities which are demanded of a practical building material. The requirements of present-day building have led to the introduction of countless new materials and to the wider use of others already known, among which are different forms of metal roofing, siding and lath which are fully worthy of the most favorable consideration. The era of the wide use of iron and steel construction may be said to be merely at a beginning, and the full possibilities of sheet metal for building are yet to be realized.

In this booklet there is given considerable condensed information concerning the metal products for roofing, ceilings, siding and lathing which are supplied by this large manufacturing firm, together with directions for measurement and methods of application. The advantages of the use of metal for building purposes are many; metal sheets used for roofing and siding have given such good proof of their "service" qualities that there is no necessity for dwelling on their merits. They are fire-and lightning-proof, a feature of value to owners of buildings in rural districts or in places removed from fire protection, and their neat appearance, weather-resisting qualities and the fact that they are clean and sanitary account in a large measure for their growing use, to say nothing of their reasonable cost and the fact that metal products cut to advantage and their use involves little if any waste.

ANNOUNCEMENTS

H. T. Lindeberg, 2 West 47th street, New York, announces the opening of a branch office under the management of his associate, John F. Staub, in the Union National Bank Bldg., Houston, Texas.

Ross Love Henderson, architect, announces the removal of his office to 312-314 Capitol Theatre Bldg., Detroit.

The Thomas M. James Company announce the removal of their offices to Room 2117, 342 Madison avenue, New York.

Miles E. Miller, Taylor Woolley and Clifford Evans, architects, have dissolved partnership—Miles E. Miller retaining the present offices, 715 McIntyre Bldg., Salt Lake City. Taylor Woolley and Clifford Evans will form a partnership under the firm name of Woolley & Evans, with offices at 616 McCornick Bldg.

McKenzie, Voorhees & Gmelin announce the removal of their offices to the 20th floor of the Canadian-Pacific Bldg., 342 Madison avenue, New York.

Robert Whitten announces that he has opened offices at 4614 Prospect avenue, Cleveland, for practice in general city planning and city zoning. Mr. Whitten will be associated with A. D. Taylor, landscape architect and town planner, and will have the assistance of his thoroughly equipped organization.

Hobart B. Upjohn, in opening his new offices in the Grand Central Terminal, New York, announces that in his practice of architecture he will have associated with him Aaron G. Alexander and Otto F. Langmann.

Layton Allen, Indianapolis, and Hubert M. Garriott, Logansport, Ind. announce the formation of a partnership for the practice of architecture. The new firm will be known as Allen & Garriott, Architects, with offices at 401 Lombard Building, Indianapolis, and 4 Masonic Building, Logansport, Ind. Manufacturers' catalogs and samples requested.

Oscar T. Lang, Arnold I. Raugland and Carroll E. Lewis announce the opening of an office for the practice of architecture and engineering at 627 Metropolitan Bank Building, Minneapolis. Manufacturers' samples and catalogs are desired.

Andrew J. Thomas announces the removal of his office to 15 East 47th street, New York.

Arthur C. Runzler has opened an office for the practice of architecture at 144 Oneida street, Milwaukee. Manufacturers' catalogs and samples are requested.

N. S. Spencer & Son announce the removal of their offices to 1830 Calumet avenue, Chicago.

Benton S. Russell announces the opening of an office at 1948 Grand Central Terminal, New York, for the practice of architecture. Mr. Russell was formerly at 239 Astoria avenue, Astoria, L. I.

COOPERATION WITH ARCHITECTS
IN
INTERIOR DECORATION

Experienced salesman of interior decorations, widely known and of high standing among wholesale producing trade, with extensive experience in placing contracts for both large and small amounts, appreciating the tendency among architects toward complete control of all the details of their jobs, seeks position with architectural organization where his wide knowledge, standing and experience will be an asset to the firm. Address A. B. C., THE ARCHITECTURAL FORUM, 142 Berkeley St., Boston.

Clarage Equipment is a Guarantee of Adequate Ventilation in Hundreds of Buildings Throughout This Country

Multiblade Fans Were Recently Installed in These Buildings

STANDARD
ACCIDENT INSURANCE CO.
BUILDING, DETROIT, MICH.

STRAUS BANK BLDG.
NEW YORK CITY

ST. MARY'S HOSPITAL
ROCHESTER, MINN.

Construction Counts

Disregard for the moment capacity, speed, outlet velocity and efficiency, and dig down to bed-rock fan construction. Not that performance characteristics are unimportant, but of what value is high efficiency, for instance, if the fan is poorly built and soon wears out? Comparison of engineering data will establish that Clarage Kalamazoo Multiblade Fans are just as economical in operation as other makes, while investigation, either by perusing our literature or by examining a Clarage heating and ventilating installation, will convince you of the superior construction of the Multiblade Fans.

It has been our ideal to produce fan equipment that endures—that will give satisfactory service ten, twenty years hence. Architects who always select Clarage Kalamazoo Multiblade Fans and installations of a decade ago, which operate now as satisfactorily as the day they were made, are evidence that we have progressed toward our ideal. Construction counts!

Write for Catalog No. 52

CLARAGE FAN COMPANY

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Philadelphia · Detroit · Pittsburgh
Minneapolis · Boston · St. Louis
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Main Office and Factory, KALAMAZOO, MICHIGAN

CLARAGE — KALAMAZOO Multiblade Fans

Manufacturers' Catalogs and Business Announcements

CATALOG REVIEW

THE RUBEROID CO., Chicago, New York and Boston. "Ruberoid Facts Worth Knowing" (6 x 9 ins.).

The durability of a building as well as its usefulness depends very largely upon the integrity of its roof, and there are few details with which it is more necessary that architects and builders be fully familiar. Roofs of structures being built today are of numerous materials, a large proportion being what are sometimes called "fabricated" substances, the backbone of which is felt, treated with what is known as the "saturant," the use of which is to waterproof and protect the fibers of the felt, preserving the original softness and pliability of the sheet.

This felt, therefore, serves much the same function in roofing of this kind as the steel framework in a modern sky-scraper to the actual structure, and yet it is not possible to tell by merely testing a sheet of roofing material just what sort of felt is used, partly because it is hidden by the "saturant" with which it is filled and partly because it is enclosed between two layers of bituminous coating which form the top and bottom layers of the roofing substance. Even if it were possible to examine and test the felt it would be difficult if not impossible to judge of its wearing qualities, since actual wear is the only real test of worth and such a test would require several years; hence the necessity of using a roofing material of proved value.

The purpose of this brochure is to bring to the attention of architects, contractors and builders the durability of the various materials included among the "Ruberoid Weatherproofing Products," such as roll-roofing, shingles, sheathing papers, floor coverings, deck cloth, plastic, paint and varnish, further information and printed data concerning which will be furnished to anyone interested.

Architectural
Interior Decoration and Furnishing
Cooperation Innovation

Widely and variedly contracting experienced interior decorator salesman, conversant with and standing high in estimation of wholesale producing trade, appreciating the trend of many architects toward the entire control of their work, seeks a position in an architectural organization wherein the advantages derived from the above knowledge, standing and experience will be an asset for the firm. For particulars, apply to A. B. C., THE ARCHITECTURAL FORUM, 142 Berkeley St., Boston, Mass.

ANNOUNCEMENTS

R. K. Knox, formerly of Champaign, Ill., has opened an office for the practice of architecture at 215–216 Liberty Life Bldg., Cape Girardeau, Mo.

Fred J. James, architect, announces the opening of his enlarged offices in the Citizens Bank Bldg., Tampa, Fla. Manufacturers' samples and catalogs requested.

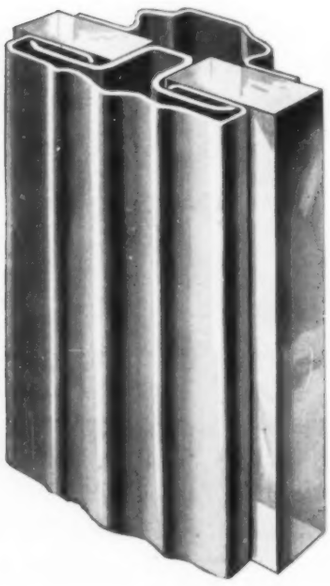
Lee & Hewitt, engineers and architects, announce the removal of their offices after May 1 to the Dodge Bldg., 53 Park place, New York.

Meyer J. Sturm, architect, announces the removal of his office to 232 East Erie street, Chicago.

Walter F. Martens, formerly a member of the firm of Steube & Company, Danville, Ill., has opened offices at 212-214 Boyd Bldg., Charleston, W. Va., for the practice of architecture and landscape designing.

Brasco Store Front Construction

Correction of April Advertisement



The Brasco Manufacturing Company in their April advertisement illustrated in detail the various features of their store front construction. Through error an incorrect diagram of the division bar was printed. We show here the correct construction in which will be noted the reinforcing bar between the sheets of glass. Machine screws bind the whole bar together, forming a tight clamp against the glass.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, ETC., OF THE ARCHITECTURAL FORUM

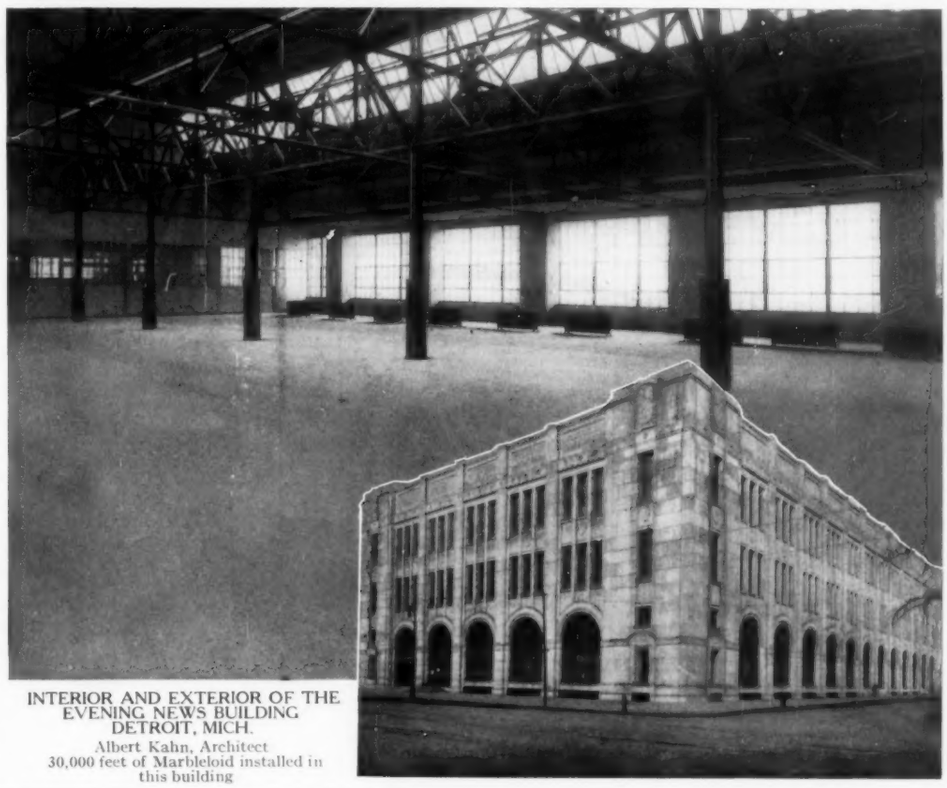
Editor: Albert J. MacDonald.
Managing Editor: None.
Business Manager: Robert Sweet.
Owners: Albert J. MacDonald, Holbrook, Mass.; Henry B. Dillenbach, Brookline, Mass.; S. Howard Myers, New York, N. Y.; Robert Sweet, Melrose, Mass.
Bondholders, mortgagees and other security holders: None.

(Signed) ALBERT J. MACDONALD, *Editor*.
Rogers and Manson Company.

Sworn to and subscribed before me this 12th day of April, 1922.

ROBERT SWEET,
Notary Public.

Manufacturers' Catalogs and Business Announcements



INTERIOR AND EXTERIOR OF THE EVENING NEWS BUILDING DETROIT, MICH.
Albert Kahn, Architect
30,000 feet of Marbleloid installed in this building

Excellent—For Industrial Buildings

MARBLELOID *Permanent* Flooring is recommended for use in Industrial Buildings, due to its combination of many qualities. It is a floor with a long life—there is no tendency to crack, chip or dust. It is fireproof, waterproof and climateproof. It is easy on the feet. It is attractive in plain color in the workrooms—and in plain color or decorative combinations in the office.

It has a tensile strength of 900 pounds per square inch. It minimizes sound and therefore is conducive to a quieter workroom or office. It is good for so many years of service that it is the most economical type of flooring—there is no upkeep cost. The color lasts as long as the floor.

Marbleloid is laid plastic and sets into a seamless, smooth-surfaced floor. We make it and install it, guaranteeing our workmanship and material, thus protecting the architect against any possible dissatisfaction.

Each week, dozens of Marbleloid Floors are laid. **They are specified for all types of buildings from Industrial to School, Hospital, Bank, Apartment and Public.** *If you are not acquainted with this flooring, write for complete specifications, samples, color card and list of completed contracts.* Also see Sweet's.

THE MARBLELOID COMPANY - 1404 Printing Crafts Bldg., New York

MARBLELOID

The Universal FLOORING for Modern Buildings

Manufacturers' Catalogs and Business Announcements

CATALOG REVIEW

SKINNER ORGAN CO., Boston. "The Skinner Organ," a portfolio of views of interiors of different kinds in which Skinner organs have been installed.

The production of pipe organs differs materially from that of most other equipment entering into buildings. Since each installation is a separate and distinct problem, no hard and fast rules for their making can be formulated, and this publication aims at presenting to architects and prospective clients only such information as will be generally helpful. Architects are frequently at fault in providing for organ spaces which are not well suited to the purpose, a mistake not always recognized until it is too late to correct it, but which sometimes results in injuring the effectiveness of the organ's use. A properly built pipe organ requires suitable space, correctly disposed for the purpose, added to which atmospheric and other conditions necessary to the welfare of the instrument must be satisfied. Without being in any sense a technical treatise on organ building or even on the use of organs, this publication offers information which architects would do well to obtain.

ANNOUNCEMENTS

Giaver, Dinkelberg & Ellington announce the removal of their offices from the Book Building to 1507 Stroh Building, Detroit. Manufacturers' catalogs requested.

Beacham & LeGrand, architects, announce that after March 1 their offices will be located at 211 Bruce Building, North street, Greenville, S. C.

Frank Irving Cooper Corporation, architects and engineers, announce the removal of their office from 33 Cornhill to 172 Tremont street, Boston.

Nichols, Sheppard & Colthurst, architects and engineers, are now located in their new offices, Dowler Building, Sandwich street, W., Windsor, Canada.

The Van Tanner Building Co., 116 West 39th street, New York City, have been recently organized for the purpose of constructing suburban homes in all the nearby boroughs and in the State of New Jersey, and are desirous of obtaining all manufacturers' literature pertaining to materials and equipment used in the modern home.

Samuel Hannaford & Sons announce the removal of their office from the Hulbert Block to the 10th floor, Dixie-Terminal Bldg., Cincinnati, Ohio.

Adden & Parker, architects, announce the removal of their offices March 1 to 177 State street, Boston.

Byron E. Porter has opened an office for the practice of architecture at Room 1119, Tremont Bldg., Boston. Manufacturers' samples and catalogs requested.

Warren & Knight, architects, announce that after January 1, 1922, John Eayres Davis, formerly practising architect of Detroit, Mich., will become a member of the firm. The new firm name to be Warren, Knight & Davis, architects, with offices at 1607–22 Empire Bldg., Birmingham, Ala.

The Kenneth H. Gedney Company, architects and engineers, announce the opening of their office in the Loyal Mystic Legion Bldg., Hastings, Neb. Manufacturers' samples and catalogs requested.

Silverstein & Infanger, 188–190 Montague street, Brooklyn, N. Y., are desirous of receiving manufacturers' samples and catalogs.

Hein & Hauskey, architects and engineers, announce the removal of their offices to larger quarters on the 4th floor of the Builders Exchange, Minneapolis, Minn.

George E. Trent announces the opening of an office for the practice of architecture at 613½ Ninth street, Huntington, W. Va. Manufacturers' catalogs and samples desired.

CORRECTIONS

In the advertisement of the Carter Bloxonend Flooring Company, Kansas City, Mo., appearing in the March issue of THE ARCHITECTURAL FORUM, an error was made in mention of the architect of the Cleveland Ohio School Board as W. R. McCormick instead of W. R. McCornack.

THE FORUM regrets that the name B. Leo Steif & Co., associate architects of the Emerman Bldg., was omitted from the March advertisement of the Brasco Mfg. Co.

ANNOUNCEMENT

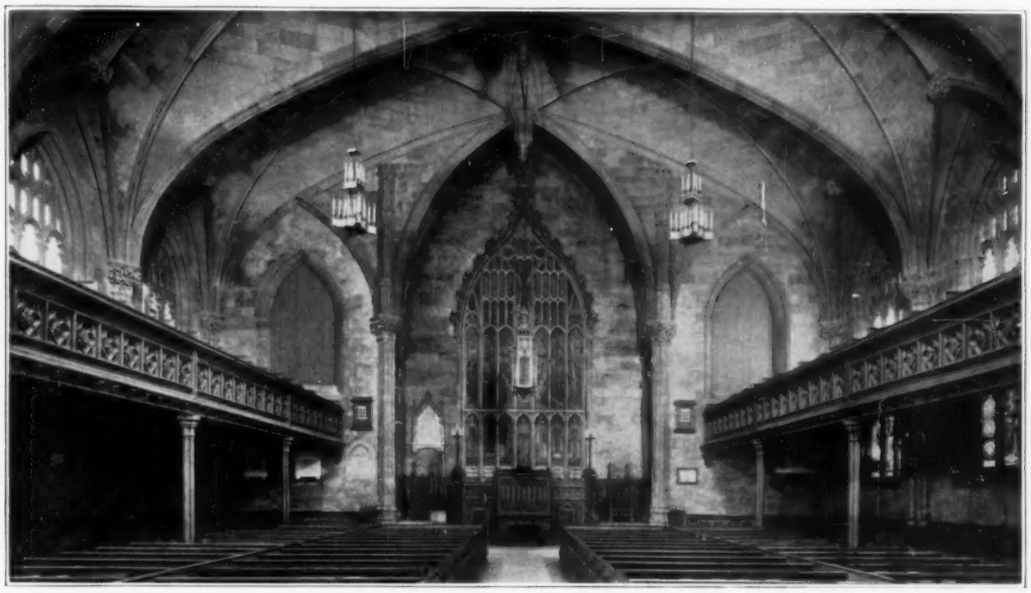
Competition for Two Scholarships

Two scholarships of three hundred dollars each are offered in the scholastic year of 1922–23 for special students in the fourth year of the course in Architecture at the Massachusetts Institute of Technology. They will be awarded as the result of a competition in design under the direction of the Committee on Design of the Department of Architecture.

The competition is open to citizens of the United States of good character, who are between twenty-one and twenty-eight years of age, and who have had at least two years of office experience. Competitors must furthermore present satisfactory evidence of a knowledge of descriptive geometry.

The competition will be held in July, 1922. Competitors are allowed to prepare their drawings wherever conditions conform to the requirements of the Committee, but these drawings must be sent to Boston for judgment.

Applications should be received before May 15, addressed to Professor William Emerson, 491 Boylston st., Boston, Mass.



Grosvenor Atterbury, *Architect* Interior of First Presbyterian Church, New York City Horace Moran, *Decorator*

Embellishing Architecture

WHERE the work of the architect calls for the use of paint to finish the high walls and deep groined arch space of a spacious interior the decorator must use the finest paint available. The illustration shows an interior view of the First Presbyterian Church, New York City. Here the wall space has been cleverly painted in imitation of aged stone. The decorator selected LIQUID VELVET for this particular piece of work. The effect is so good that only a close inspection reveals that it is secured by paint and not mason work. For "Walls of Lasting Beauty — Ceilings that Endure" specify LIQUID VELVET. This is the perfect flat wall finish, recognized as such by the leading interior decorators, used on some of the finest jobs of interior decorating in the country.

The Varnish That Stands All Tests

MASTER VARNISH is more than a varnish — it is varnish perfection. It will stand all the tests that ALL other varnishes stand and many that NO OTHER VARNISH WILL. Master Varnish is an absolutely waterproof varnish. It is impervious to scalding hot, icy cold or salt water. It will dry dust free in from two to three hours and will be dry enough for service in from twenty-four to thirty hours under normal drying conditions. For interior or exterior work, for the most severe test of wear or weather Master Varnish is superior. For unusual service use Master Varnish.

O'Brien Varnish Company

1720 Washington Avenue **South Bend, Indiana**

Save the surface and you save all

Liquid Velvet — THE SPECIFIED BRAND

Master Varnish

O'Briens

Manufacturers' Catalogs and Business Announcements

CATALOG REVIEW

THE SHERWIN-WILLIAMS CO., Dept. B-435, 601 Canal road, Cleveland. "The House Painting Manual" (6 x 9 ins.). 168 pp. Price 50 cents.

Since painting in one form or another is a necessary part of almost everything in the way of building or furnishing, it is quite important that the use of paint and its possibilities be well understood. Nevertheless, unless one has tried to obtain practical information as to the actual use of paint, it will not be realized how difficult it is to secure what might be supposed to be the most readily acquired knowledge. To convey this information to architects, decorators, or to the public in general is the purpose of this little book, issued by the Department of Decoration of this large paint manufacturing firm.

The book may be described as a complete manual in miniature covering the use of paint. In addition to giving directions in the plainest possible English as to the use of paints, stains, varnish and other materials of this nature, the book suggests various color combinations suitable for homes of different types—combinations suitable for the interior as well as the exterior—and it describes the use of stencils and makes valuable suggestions as to the refinishing of almost any surface or object upon which paint is likely to be used.

Through the whole book runs the desire to give information of practical value. In the matter of wall glazing and creating surface texture by means of stippling, each operation is minutely described, including definite suggestions for equipment that has been found workable in practice. A number of color plates illustrate different wall treatments and they are accompanied by specifications intended to produce the result pictured.

Detailed consideration of the properties of the various finishing woods and their reactions under stain and paint, and a brief treatise on color harmony complete a book that should prove very helpful in a field where concise information has been difficult to obtain.

VENDOR SLATE CO., Easton, Pa. "Vendor Roofing Slate" (8½ x 11¼ ins.). 24 pp.

This booklet has been issued to supply architects information in brief form on "architectural" slate roofs. It gives practical suggestions grown out of experience on the grouping of color and varied sizes and thicknesses of slate to obtain artistic and practical roofs. The various kinds and grades of slate supplied by the company are described, and detailed specifications given for roofs of both architectural slate and commercial grades. Two plates show construction details for valleys, dormers, ridges and varied flashing requirements. A number of good examples of slate roofs selected from the work of representative architects are shown in photographic illustrations.

ANNOUNCEMENTS

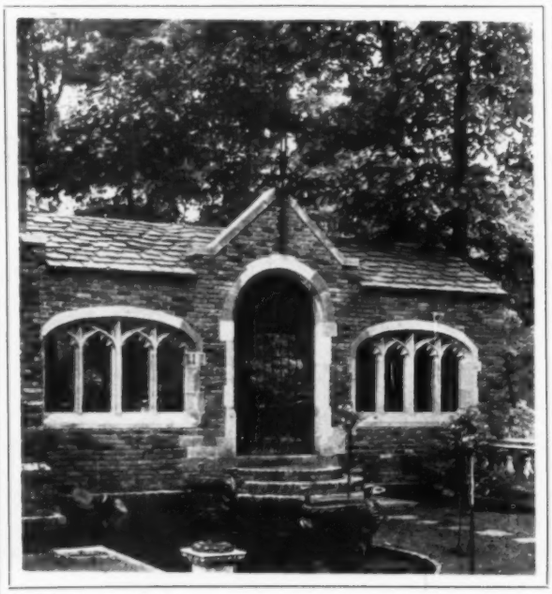
Eric Kebbon, formerly associated with Welles Bosworth, announces that he is now established in the practice of architecture at 522 Fifth avenue, New York.

J. Ivan Dise, formerly with Albert Kahn, Detroit, and Cass Gilbert, New York, announces the opening of an office for the practice of architecture at 424 McKerchey Bldg., Detroit, Mich. Manufacturers' samples and catalogs requested.

W. H. Reeves, successor to Reeves & Baillie, architects, announces that Messrs. Ralph R. Burgess and George W. Meyer have become members of the firm, which will continue the general practice of architecture under the firm name of Reeves Burgess & Meyer, with offices at 125 North Jefferson avenue, Peoria, Ill.

Jamieson & Spearl, architects, announce the removal of their offices from the Security Bldg. to Suite 1116–26, Arcade Bldg., St. Louis, Mo.

John M. Marriott, formerly of the firm of Marriott, Allen & Hall of Columbus, Ohio, announces the opening of his office for the practice of architecture at Suite 301, Oppenheimer Bank Bldg., San Antonio, Texas. Manufacturers' samples and catalogs desired.



Chas. I. Berg, *Architect*

Tudor Stone Roofs

As quarried by

The RISING & NELSON SLATE CO.

Since 1869 Miners and Makers of High-grade Roofing Slates

Quarries and Main Office, West Pawlet, Vermont

Architects' Service Department, 101 Park Avenue, New York

CHICAGO PHILADELPHIA BOSTON

Making Schoolhouse Steps SAFE

Architectural attractiveness was a factor—it was essential that every step be made slip-proof and safe—the steps had to be made durable—maintenance costs had to be eliminated.

The architects (Frost & Chamberlain) of the Worcester Girls' Trade School, Worcester, Mass., a beautiful $350,000 building, solved this stairway problem with ALUNDUM SAFETY TILE. The stairtreads are cast iron with steel risers. The cast iron tread is depressed to receive the tile which is set in cement mortar.

Thus every step in the building, two sets of stairways from shower baths to the top floor, are made slip-proof, trip-proof and wear-proof and the architects were able to get the desired harmonious effects.

ALUNDUM SAFETY TILE is manufactured by

NORTON COMPANY

Worcester - - Massachusetts

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151 Chambers St.

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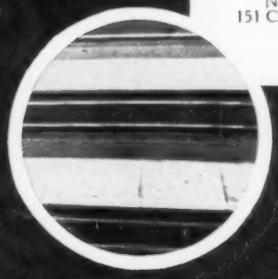
T-31



Manufacturers' Catalogs and Business Announcements

CATALOG REVIEW

THE ASSOCIATED TILE MANUFACTURERS, Beaver Falls, Pa. "Basic Specifications for Tilework" (7½ x 10½ ins.). 38 pp., Publication No. K–300. "Documents Relating to Specifications for Tilework; Work Sheets for Specification Writers" (7½ x 10½ ins.). 16 pp.

The first named publication is the result of cooperation on the part of architects, engineers, representatives of different branches of the government, various technical experts, tile manufacturers, contractors and tile setters, and its preparation has been extended over a long period of time. The matter of specifications for tilework has been given careful and exhaustive treatment at the hands of men qualified by long experience, and its publication will undoubtedly promote cooperation and more complete understanding between those engaged in different branches of the tile industry.

One section, entitled "Basic Specifications," deals with general specifications covering tilework and is written upon the hypothesis that the tile contractor is to furnish or sublet all materials and labor necessary and be responsible for the completed work. Another section, "Notes to the Architect," deals with the matter from the viewpoint of the architect, and in "Notes to the Tile Contractor" certain observations are made which apply to the performance of his duties, one more section, "Notes to the General Contractor," completing the treatment of the subject. Other pages deal with such items as schedules, accessories and other details, and the entire publication is well indexed which adds to its value.

"Documents Relating to Specifications for Tilework" is a compilation of work sheets for specification writers, and additional sheets will be supplied free of charge to those interested. The introduction to the entire work says that it has been prepared under the direction of D. Knickerbacker Boyd of Philadelphia, and that those who use the "Basic Specifications" or the "Documents" may depend upon the results of his experience proving of practical help.

SPRAGUE ELECTRIC WORKS, Main Office, 527 West 34th street, New York. "Panel Boards and Cabinets" (8 x 11 ins.). 65 pp.

The correct equipment of modern buildings of numerous types demands the use of various details of electrical equipment, the supplying of which is a highly specialized business. This bulletin (No. 47901) is devoted to describing and list-pricing the numerous forms of cabinets and panel boards which experience has proved to be those which best meet general requirements, information concerning other styles adapted to special needs being supplied on request. The panel boards here listed are arranged for National Electrical Code enclosed fuses or Edison plug fuses, and both types are furnished either with or without knife blade, rotary snap or push-button switches in branches as may be desired. They are designed for 125-volt, 2-wire or for 125-volt, 3-wire service. All the appliances listed in this catalog meet the requirements of the National Board of Fire Underwriters.

A section of this catalog is devoted to a description of the "Sprague Metering Panel," particularly adapted for use in office buildings, apartment houses and other structures where electrical current is supplied to different rooms and for different tenants. Formerly a meter was necessary for each room, but by using the "Sprague Metering Panel" any room or combination of rooms belonging to one tenant can be metered through one meter by merely changing the location of the meter connector on the face of the board. Other recent bulletins are those on "Sprague Mantel Circuits" (No. 47941) and "Safety Panel Boards and Cabinets" (No. 47942).

ARCHITECTURAL SERVICE CORPORATION, Philadelphia. "Architects' Service Sheet No. 38," complete in four parts (16½ x 21½ ins.).

The particular qualities of sheet zinc which render it of especial value for roofing are its lightness and economy as compared with some other materials which are sometimes used for this purpose, while its use for more than a century has amply demonstrated its durability. This "Service Sheet," issued by the American Zinc Institute, Inc., brings to the office of the architect or roofing contractor invaluable data, containing as it does standard specifications which apply to many widely different roofing conditions as well as drawings which illustrate the use of sheet zinc on roofs of various constructions. The directions and suggestions for estimating are features which render the Service Sheet of additional value, and it also includes a comparison of gauges and thickness in inches and a table of approximate weights.

ANNOUNCEMENTS

Boyd, Abel & Gugert announce the removal of their offices to the Otis Bldg., 112 South 16th street, Philadelphia.

W. Whitehill, architect, announces the removal of his office to the Buckley-Newhall Bldg., Forty-first street and Sixth avenue, New York.

G. Herbert French announces that he has severed his association with W. Duncan Lee, architect, and has opened an office at 513–515 Times-Dispatch Bldg., Richmond, Va., for the practice of architecture. Manufacturers' catalogs and samples requested.

John T. Comes, architect, Renshaw Bldg., Pittsburgh, Pa., wishes to announce that he has taken into partnership two of his former associates, Will R. Perry and Leo A. McMullen. The firm will henceforth be known by the name of Comes, Perry & McMullen.

Ernest F. Coe, landscape architect, announces the removal of his office to 951 Forest road, New Haven, Conn.

ANNOUNCING

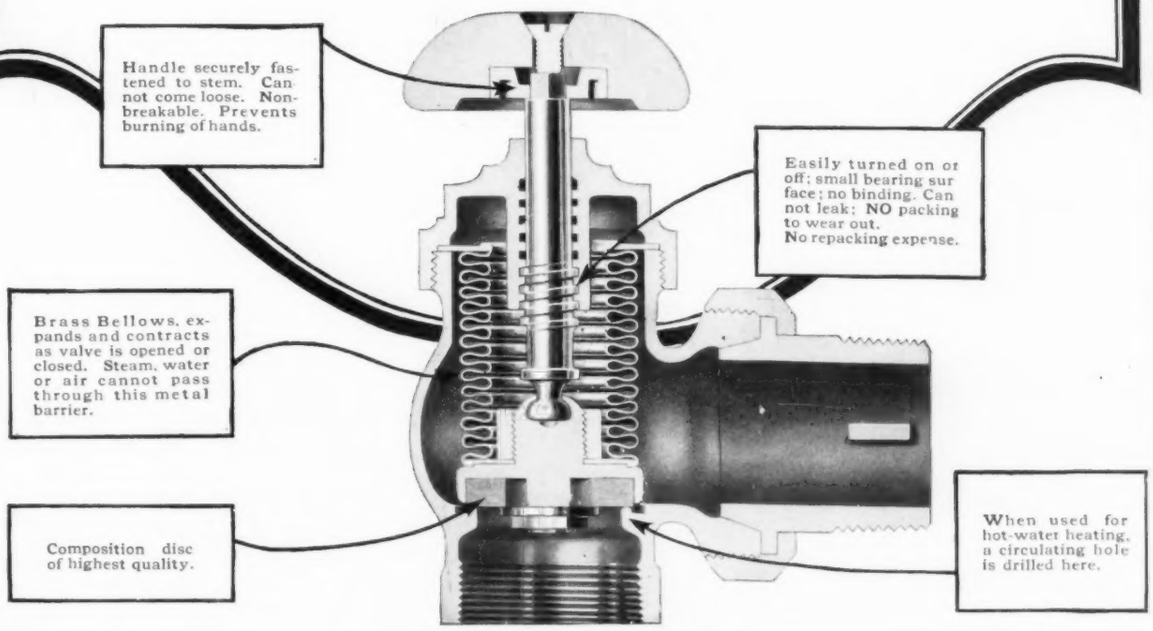
The new Ideal Packless Valve

RADIATOR HEATING — with its surroundings of refinement — has waited long for a suitable, appropriate Supply Valve *that would not leak steam, water or air.*

A refined Radiator valve—dependable, without packing, of attractive design and moderately priced—is assured an immediate welcome by a long-suffering public.

The new Ideal Packless Valve (designed by our engineers and using a bellows of our own manufacture) represents our idea of a perfect combination of all the essentials of efficient service in an appropriate design.

We recommend this valve as worthy of your specification.


Handle securely fastened to stem. Cannot come loose. Non-breakable. Prevents burning of hands.
Easily turned on or off; small bearing surface; no binding. Can not leak; NO packing to wear out. No repacking expense.
Brass Bellows, expands and contracts as valve is opened or closed. Steam, water or air cannot pass through this metal barrier.
Composition disc of highest quality.
When used for hot-water heating, a circulating hole is drilled here.

AMERICAN RADIATOR COMPANY

AMERICAN Radiators and IDEAL Boilers for every heating need

104 West 42nd Street, New York Dept. 117 816 So. Michigan Ave., Chicago

Manufacturers' Catalogs and Business Announcements

CATALOG REVIEW

THE JEWETT REFRIGERATOR CO., Buffalo, N. Y. "Jewett Solid Porcelain Refrigerators" (8½ x 11 ins.). 20 pp.

Many things once thought to be secure in our effort for higher standards are giving way to improvement, and the march of purity and sanitation brings refrigerators with linings likened to Europe's "china." The company issuing this booklet has succeeded in producing an integral clayware compartment for its refrigerator with a surface like a tea cup. The principles of air circulation are employed and advantageous elements are amplified so that the maximum is obtained in coldness, dryness and cleanliness. Insulation and material used in case construction are shown to be equal to the high quality of the lining. Various plans of arrangements for icing and compartment doors are obtainable and movable refrigerators of standard models are fitted for all practical uses. Built-in types with outside icing facilities are made on order in co-operation with architects, and a butler's pantry refrigerator to install at counter height adds a notable example to the available units. Any one of the units manufactured can be used with mechanical refrigerating outfits by holes placed for piping.

A conspicuous point in the design of this product is the elimination of paneling, useless hardware, and in fact everything that does not make for a straightforward, utilitarian device.

JOHNSON SERVICE COMPANY, Milwaukee. "The Regulation of Temperature and Humidity" (8½ x 11 ins.). 64 pp.

Automatic control of temperatures together with its application to everyday problems is the object of this book. Projects where cold as well as heat is concerned can be governed by the apparatus here described which is of thermostatic action on pneumatic or electrical force for the operation of valves, dampers, etc. A modification of the same apparatus is used in the regulation of humidity for buildings or manufacturing processes; in fact numerous physical conditions are fixed by such equipment of thermostats. Heating and ventilating systems of any size are almost wholly dependent upon this form of control and workers in industrial lines value their constancy for certain purposes above any other human or mechanical method.

In connection with the use of compressed air or electricity as employed with thermostat systems, a day and night clock system is also devised, with valves and accessories which are the product of this company. This provides for a periodic control of boilers, vents and even the regular flushing of plumbing systems. These two systems working in conjunction preclude any failure of the human element. Thermostats of the quick-acting, graduated-acting and compound types are shown together with special valves, dampers and humidifiers. An air compressor working on usual city water pressure, without attention in its operation, is a device typical of the merit of this firm's products.

HESS WARMING & VENTILATING CO., Chicago. "Modern Furnace Heating" (6 x 9 ins.). 48 pp.

The improvement in warm air heating devices has been constant in the last ten years and this concern has been responsible to a large degree in correcting outstanding faults in the old types. The booklet mentioned here describes methods of constructing the welded steel body or radiator which confines the smoke and burned gases until they pass to the chimney. This feature remedies one of the worst faults in old furnaces — the dome and fire pot made with seams which eventually permitted the stifling fumes to enter the air chamber and mix with the hot air. Such details as placing of the humidifying water pan, design of grates, firebox and drafts, use of materials, etc., have been skillfully handled. These principles are applied to multi-pipe, one-pipe or pipeless and circulating room heaters, thereby making each type what is believed to be the most effective yet contrived by this company in half a century's activity. Many points gained by long experience are noted in connection with what is said about ducts and pipe. School, store, church and residential work are outlined with the needs of each, and illustrations and diagrams make this a handbook of hot air heating.

ANNOUNCEMENTS

Adolph Goldberg, architect, wishes to announce the removal of his office from 354 State street to 164 Montague street, Brooklyn. Manufacturers' catalogs and samples requested.

Lincoln Norcott Hall announces the opening of an office for the practice of architecture at 504 Cunard Building, 140 N. Dearborn street, Chicago. Manufacturers' catalogs and samples are desired.

W. M. Wilson announces the opening of an office for the practice of architecture at 15 Queen street, St. Catharines, Ontario. Manufacturers' samples and catalogs requested.

F. H. Marani, architect, announces that after January 15 his address will be 35 Colborne street, Toronto.

Harry J. Simmonds announces the opening of an office for the practice of architecture at room 109 Banner Building, Greensboro, N. C. Manufacturers' samples and catalogs are requested.

The Board of Education of Louisville announces the re-opening of its architectural department with Edgar A. Rassinier as architect. Manufacturers' catalogs and samples are desired.

Hobart B. Upjohn, architect, announces the removal of his offices to room 5952 Grand Central Terminal, 42nd street, New York.

Allan Burton and Marshall C. Crisp have formed a partnership under the firm name of Burton & Crisp, architects, with offices at 701 Linz Bldg., Dallas, Texas. Manufacturers' samples and catalogs requested.

Day & Klauder, architects, announce that after January 2, 1922, they will be located in the Franklin Bank Bldg., 1416 Chestnut street, Philadelphia.

Natco XXX Load Bearing Tile

Meets Every Building Requirement

THESE construction details show how well NATCO XXX Load Bearing Tile adapts itself to the needs of the architect and contractor. The individual NATCO XXX Tile units illustrated are made in various thicknesses, lay up one square foot of wall surface and are heavily scored all around to hold mortar, interior plaster and an exterior finish of Stucco applied directly to the surface of the tile, or an exterior veneer of face brick.

Frame floors can be used as readily as fireproof floors as the ends of joists are faced with a smaller tile and filled in between by tile of proper size to give the required wall thickness.

Sills of NATCO Hollow Tile or of any other material can be used effectively, preferably tile because of the insulation afforded by the enclosed air spaces.

Recessed Jamb Tile are used at double hung windows for the box frames. Casement sash with plank frames can be built in with the regular wall tile.

For lintels over openings not more than 5 feet in clear span, the regular wall tile filled with concrete reinforced with steel rods are used. For lintels over openings wider than 5 feet, reinforced concrete beams faced with 2 inch tile are often used or two smaller tile can be carried on angle irons.

Roof rafters are spiked to plank wall plates set in mortar and anchored by bolts embedded in tile.

Wood or metal plugs for anchoring window and door frames and for fastening trim can be laid up in the mortar joints.

First floors of NATCO Hollow Tile are dry and well insulated, shut out noise and free a home of the fire hazard from furnace or similar sources. Ordinary residence floors can be made in two spans with bearing at a center partition or girder on columns. Finished wood floors can be laid on wood sleepers set in cinder fill or ceramic tile floors can be laid for bath rooms, the sun porch and kitchen.

Bulletin No. 174 on NATCO WALL CONSTRUCTION and Bulletin No. 171 on STANDARD FIREPROOFING contain detail drawings of NATCO Hollow Tile as used for walls and floors of every type of building. Write for either or both of them today.

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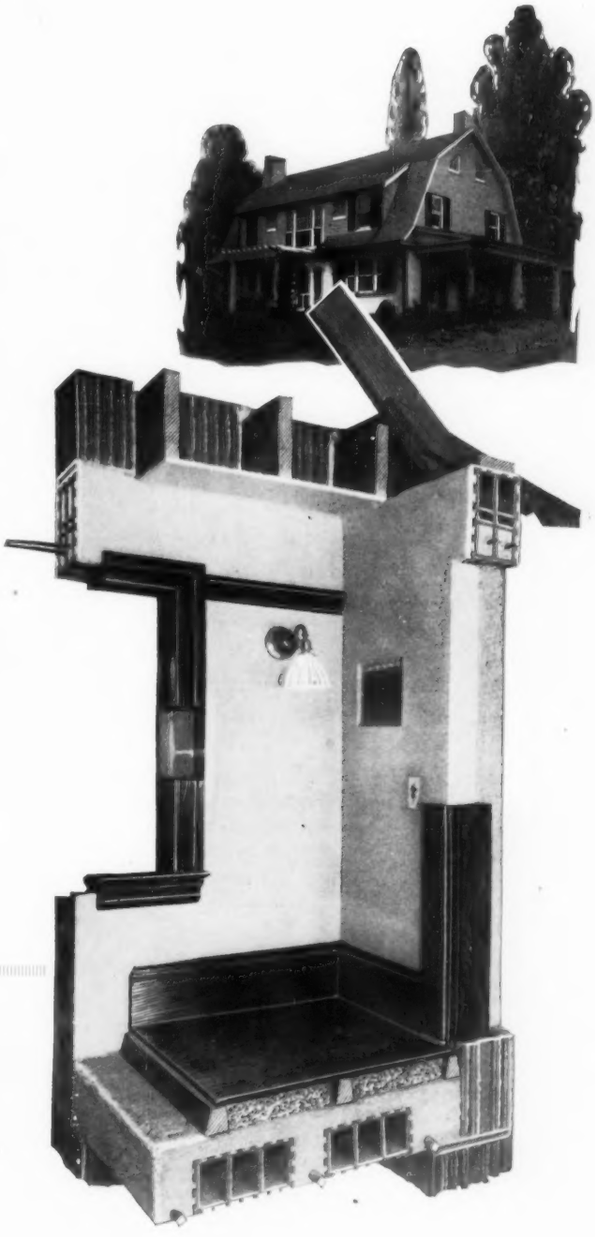

NATCO
·HOLLOW·TILE

TRUSCON
Waterproofing Paste
CONCENTRATED

Residence of
Philip P. Barber, Esq., Tenafly, N. J.
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The owner in his turn finds that he can use the basement for purposes that would otherwise have been impractical. It can be painted, decorated and made as wholesome as a living room—the dangers of dampness are eliminated.

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Unretouched photo showing condition of Terra Cotta, March 1st, 1922.

Detail of Terra Cotta construction and ornament, Madison Square Garden, New York City; McKim, Mead and White, Architects.

A 33-YEAR TEST

MADISON SQUARE GARDEN affords convincing evidence of the *durability* of Terra Cotta. After thirty-three years' exposure to climatic action its Terra Cotta is in perfect condition throughout.

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Send for our reference work, "Terra Cotta Standard Construction," a volume of seventy plates of typical details; free on request to architects, engineers, draftsmen and students of recognized professional schools. Address: **National Terra Cotta Society,** 19 West 44th Street, New York City.

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Terra Cotta in cream glaze with a black splatter

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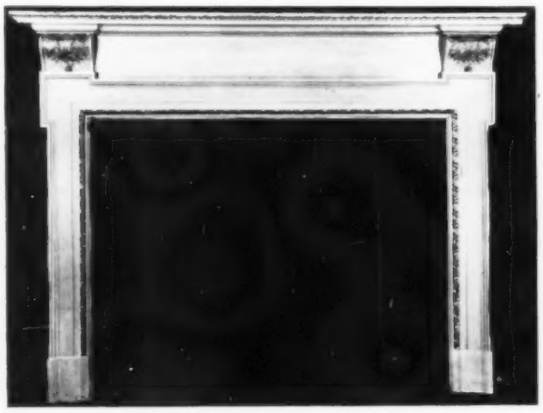

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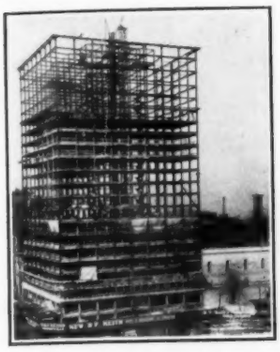
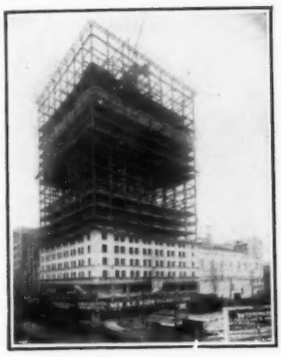
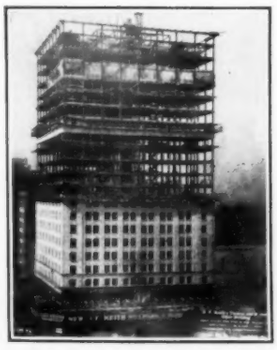


October 1



October 8



October 15

October 22

Progress Photographs

taken at intervals of one week

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A FLOOR of character—itself a decorative feature—Linotile gives individuality to the shop or store. Its variety of colors and shapes affords a wide range in designs, which may be equally expressive of the formal dignity of the jewelry establishment or the dainty atmosphere of the woman's shop.

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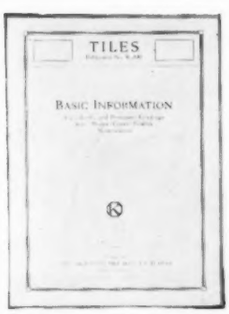
Paragraphs relating to structural features incident to Tile installation in the work of other trades.

Publication No. K-200, "Basic Information," is another document prepared for the architect's use, embracing such subjects as Ingredients and Processes, Gradings, Sizes, Shapes, Colors, Finishes and Nomenclature. Tiles are grouped and described, with Illustrations. Plates of drawings show relative proportions and classifications.

The documents here described are typical of the co-operative service which The Associated Tile Manufacturers are prepared to give. All of these publications, including several not here mentioned, are designed to accomplish the satisfactory use of Tiles in the most economical way.

Our Swimming Pool book has supplied the fundamental data for the construction of many of the finest pools. This has been credited by architects with being the most comprehensive work on this subject. Like other publications here mentioned, copies will be sent on request.

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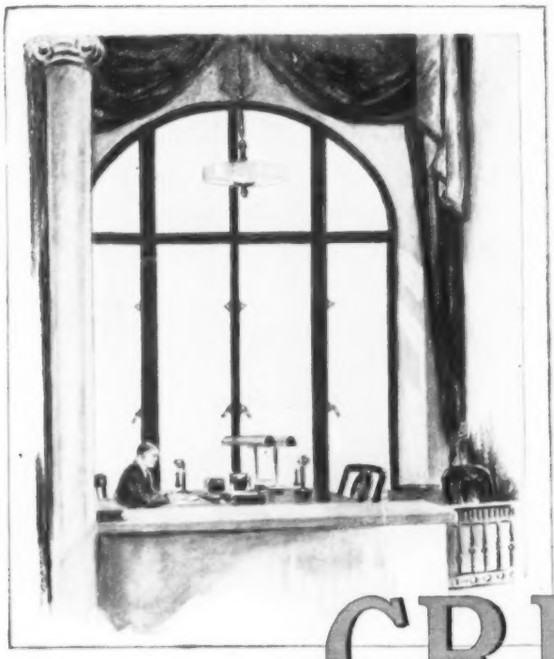

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Pp. 1202-1205

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Hoffman Casement Window

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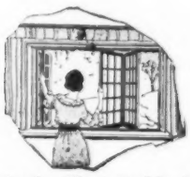

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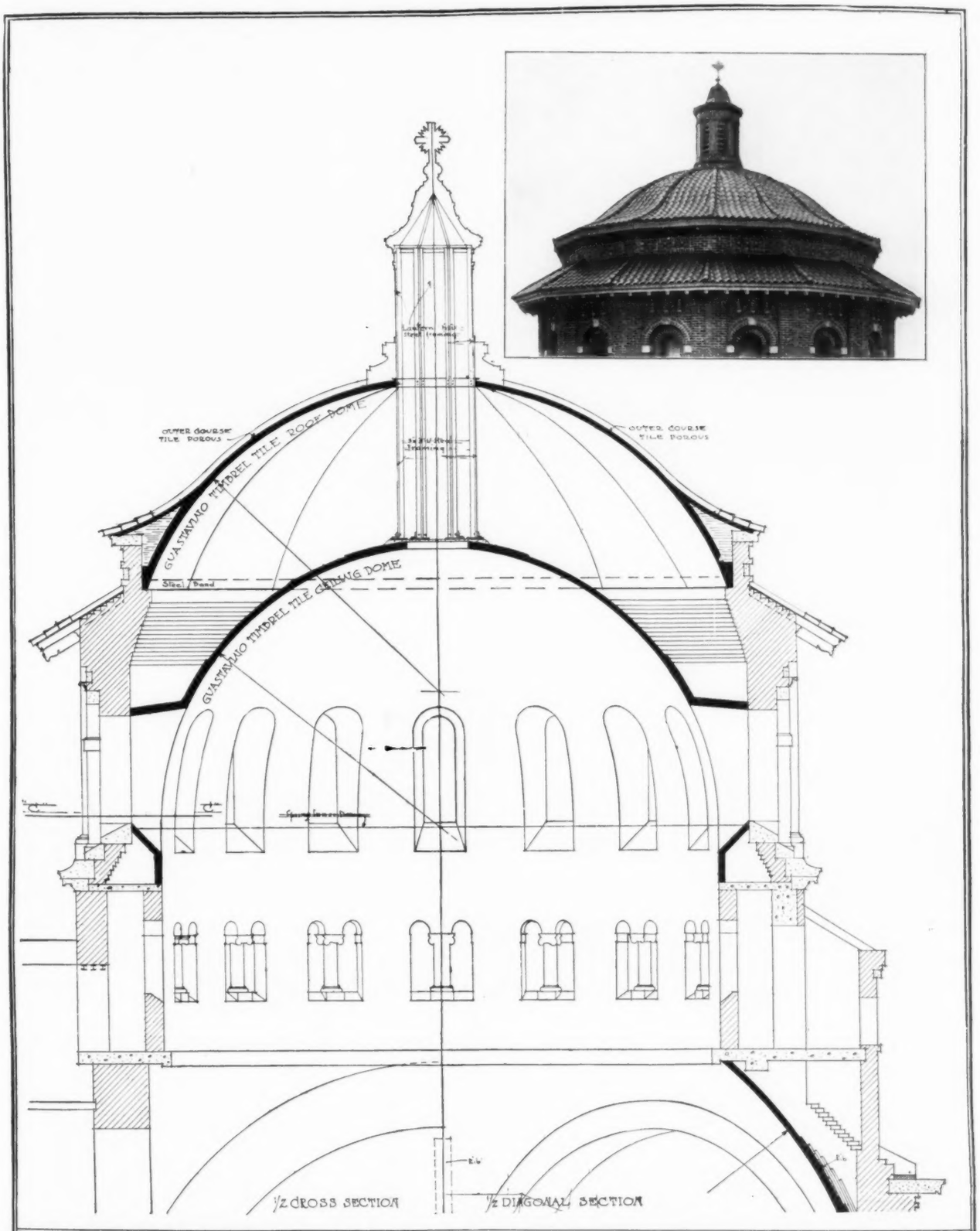

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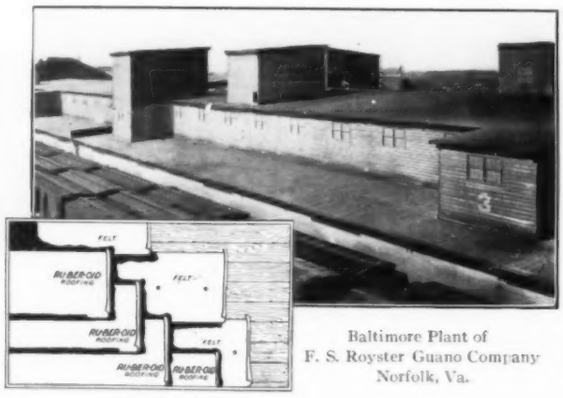

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We removed it through their courtesy to use as samples, although they say, "Appearances would indicate it is good for several years' more service."

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What, then, would you expect in the way of service from the Built-up Roof illustrated above, consisting as it does of two layers of that same material plus a layer of Ruberoid Asphalt Saturated Felt and two layers of Ruberoid Solid Bitumen? The question answers itself.

Specifications, samples, and descriptive literature will be gladly sent you on request.

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Frigidaire is Designed as a Unit

FRIGIDAIRE is designed as a single, complete unit.

It is not an adaptation of the electrical refrigeration idea to ice boxes already built, but a complete plant, all features of which—apparatus, size and shape of compartments, air-circulation, inter-wall insulation, etc.,—are designed to work *together* toward the best and cheapest refrigeration.

Frigidaire preserves food with cold, dry air. It maintains a temperature ten degrees lower than is possible with ice. Food kept in Frigidaire is preserved in perfect condition for surprisingly long periods.

Frigidaire is operated by ordinary light and power current, is entirely automatic, and is thoroughly dependable. It is a product of the General Motors Corporation—developed by expert engineers.

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A Frigidaire catalog, with complete specifications, will be mailed to architects on request.

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Subsidiary of General Motors Corporation

Frigidaire
THE ELECTRIC REFRIGERATOR *for* MODERN HOMES

Stanford, California, residence of Mr. Herbert Hoover, Secretary of Commerce. Medusa Stainless White Cement was used in the exterior stucco, and on the inside for shower baths, setting tile, etc. Architect, Mr. A. B. Clark of Stanford University, Calif.

The Residence of Mr. Herbert Hoover

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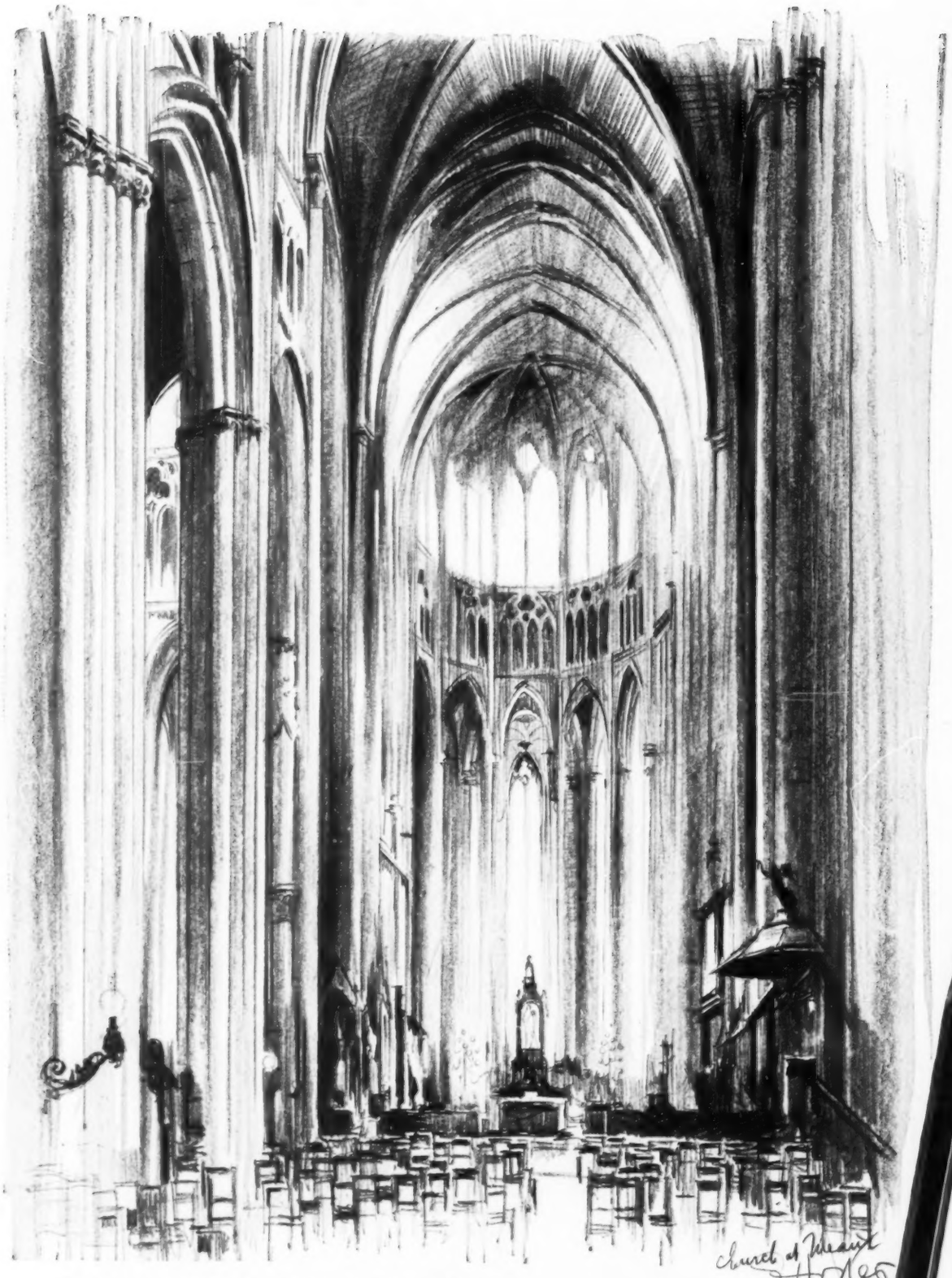

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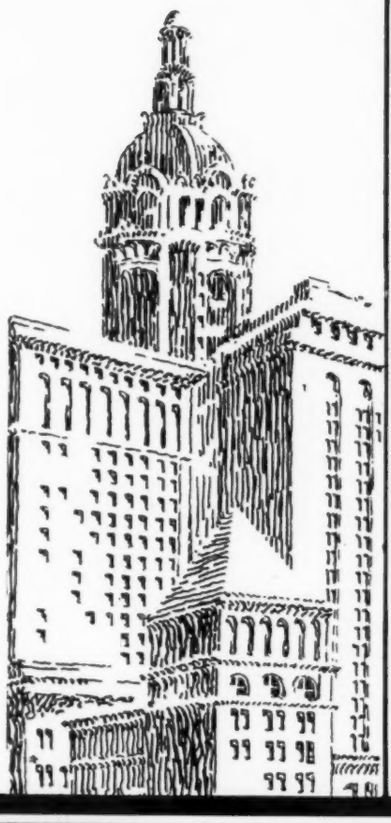

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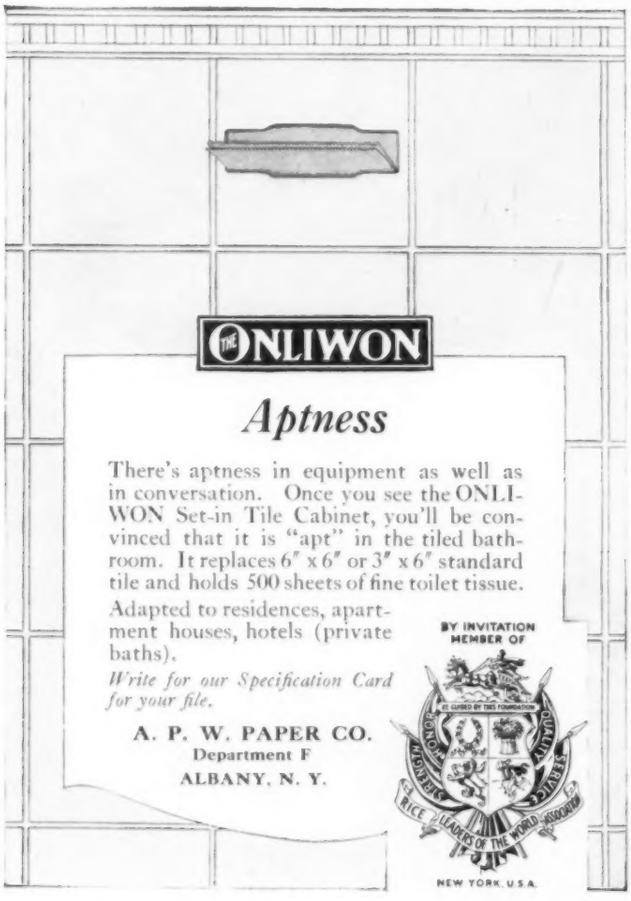

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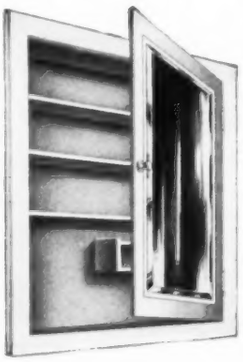

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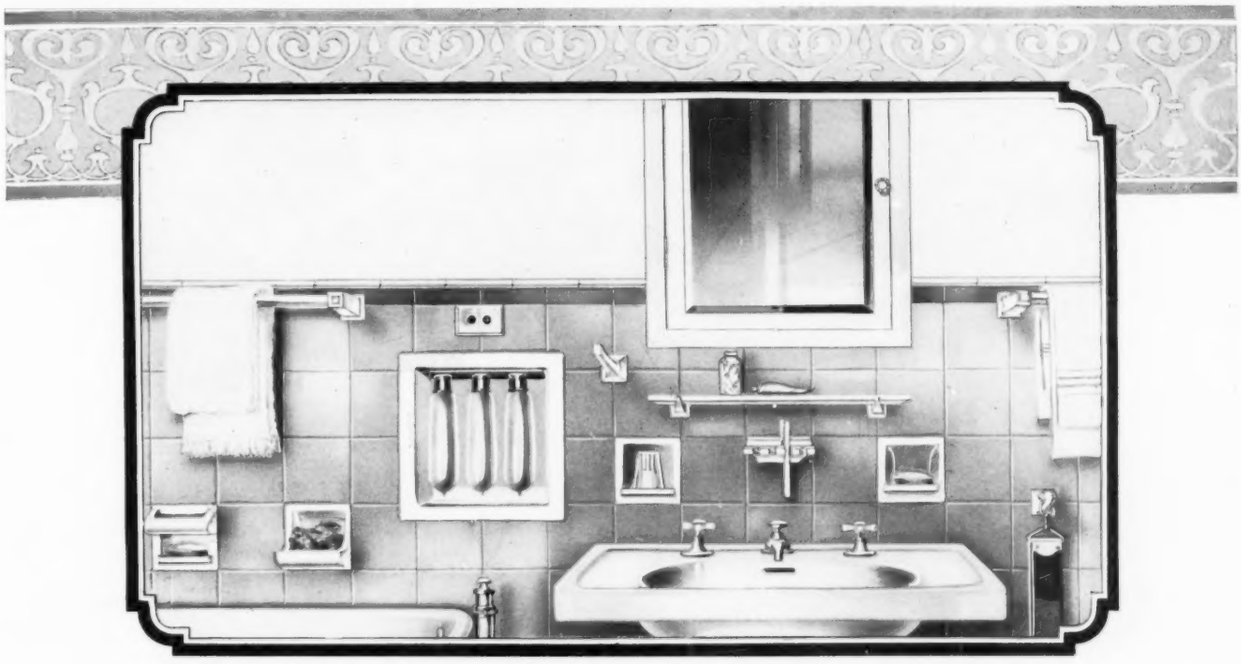

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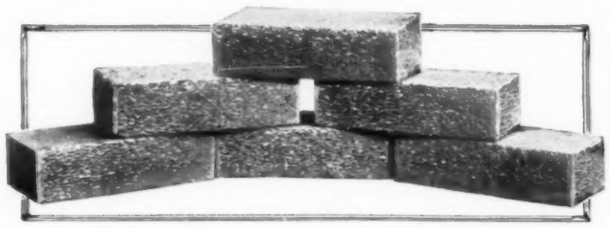

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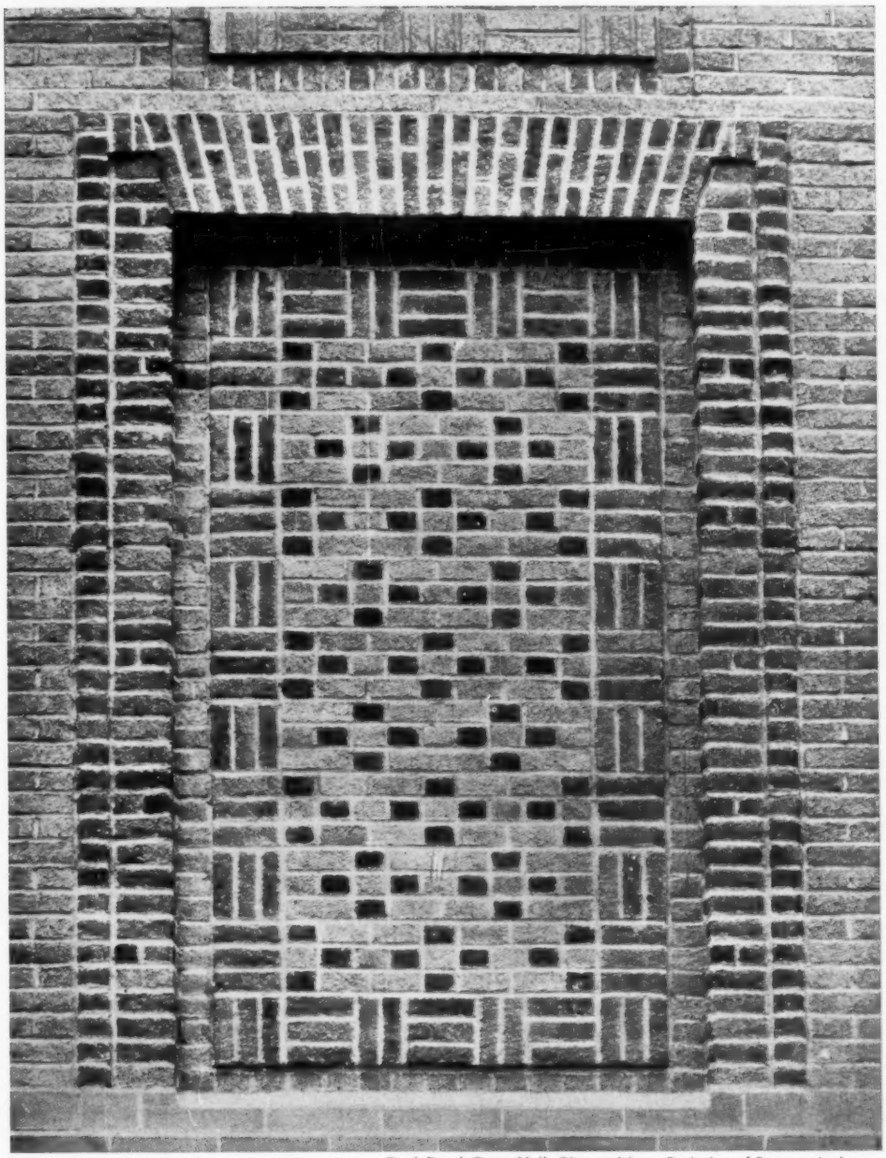

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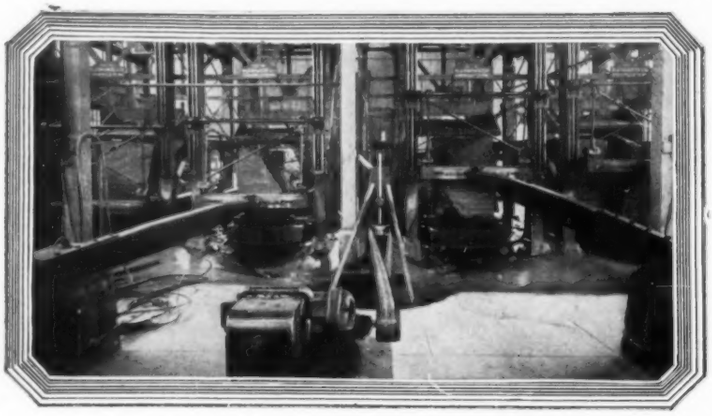

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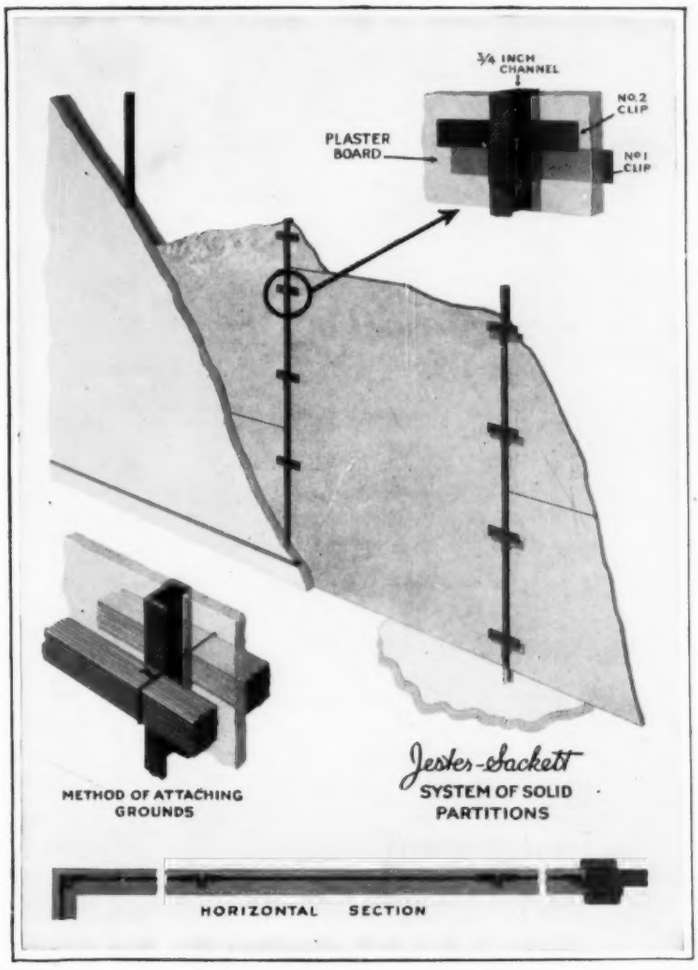

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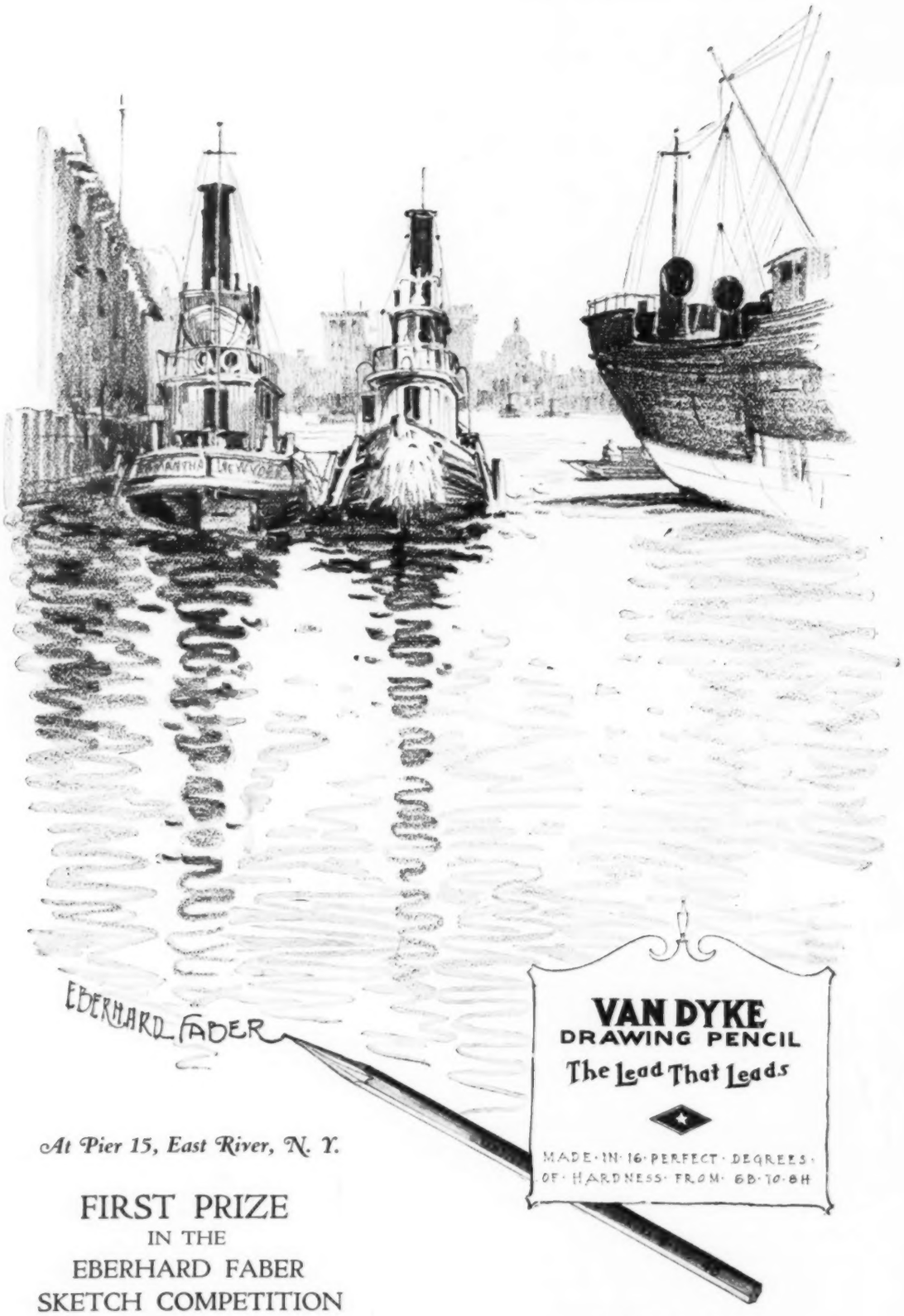

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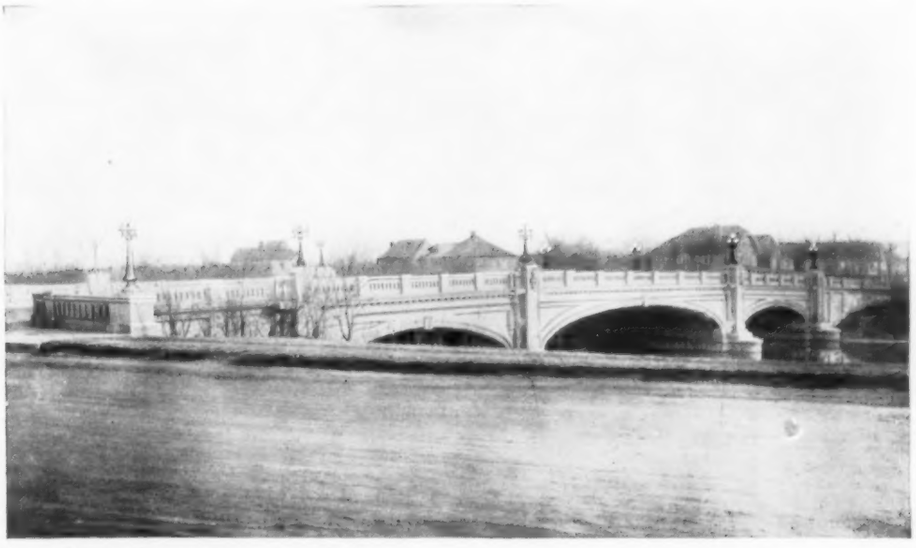

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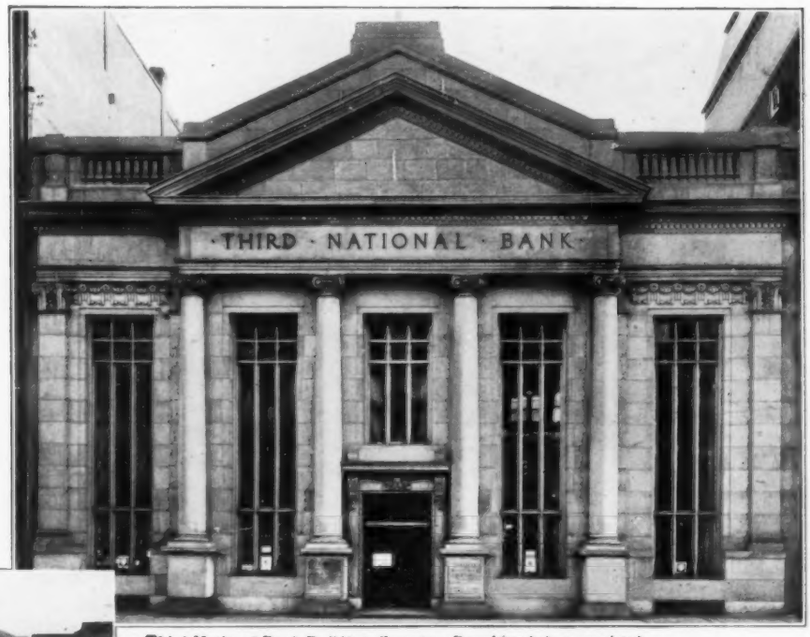

Third National Bank Building, Scranton, Pa. After being remodeled. Duckworth Brothers, Architects.

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THE ARCHITECTURAL FORUM

VOLUME XXXVI NUMBER 6

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ALBERT J. MacDONALD, Editor

Published Monthly by
ROGERS AND MANSON COMPANY
142 Berkeley Street, Boston 17, Mass.
Advertising Department, 103 Park Avenue, New York
Yearly Subscription, payable in advance, U.S.A., Insular Possessions and Cuba, $6.00
Canada ..... $6.75 Foreign Countries in the Postal Union, 7.50
Single Copies ..... 60 cents All Copies Mailed Flat
Trade Supplied by American News Company and its Branches. Entered as Second Class Matter, March 12, 1892, at the Post Office at Boston, Mass.
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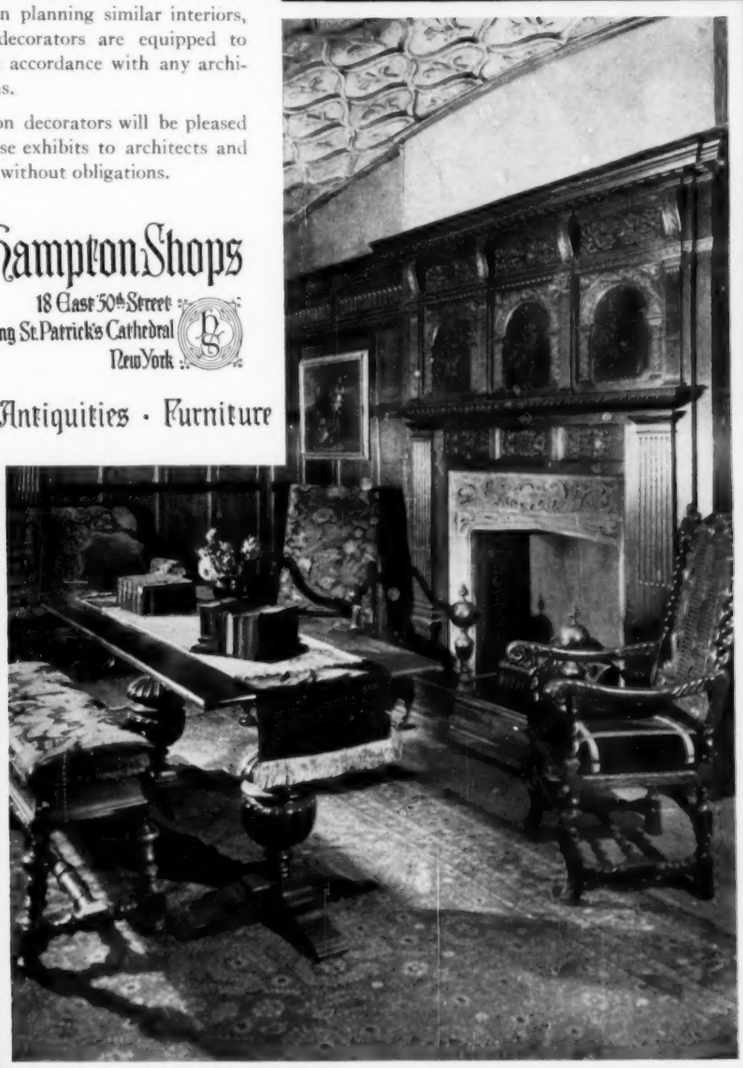

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THE MEDICI SOCIETY EXISTS IN ORDER TO PUBLISH THE FINEST FACSIMILE COLOUR REPRODUCTIONS OF GREAT PAINTINGS—of which modern photographic methods are capable—AT THE LOWEST PRICE COMMERCIALLY POSSIBLE. As to its success in fulfilling this programme the Society may quote **Mr. Ralph Adams Cram,** who, in the course of a recent statement concerning the primary necessity of training the general public in appreciation if we are to have artists to appreciate, says of The Medici Prints:
"The power of a great picture is an eternal power. . . . Yet very few can go to Florence or Belgium, and a photograph means nothing except to those who have seen the originals. These new facsimiles are in quite a different class, and I cannot see why they should not serve a brilliantly useful purpose in bringing a great part of the vital beauty of the far original to those who cannot seek it out in its distant shrine.
"It is astonishing how faithful is the reproduction . . . . I confess these colour-prints give me much of the poignant thrill of the originals.
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Publishers for the United States of **THE BURLINGTON MAGAZINE FOR CONNOISSEURS,** recognized as authoritative on questions of Art and Art History.
Among the subjects dealt with are: **Architecture, Arms and Armour, Bronzes, Oriental Carpets, Chinese Porcelain, Embroideries and Lace, Engravings, Furniture, Miniatures, Paintings, Sculpture, Silver and Pewter, Tapestries, etc.** A Classified List will be sent on request.
Illustrated. Published monthly. Per copy, $1.00; by the year, $9.00. Sample, 75 cents

The Medici Society of America, *Publishers*
745 Boylston Street, Boston

KENSINGTON FURNITURE

Early 18th Century American Maple Dresser by Kensington
One of the group illustrated in our May advertisement

THE simplicity of line and beauty of proportion that are the charm of early Colonial architecture and the native flavor which makes it seem so sympathetic to its environment characterize also the furniture made by our New England craftsmen toward the end of the 17th Century and in the early years of the 18th Century.

Kensington reproductions of this furniture, of which the dresser illustrated above is an example, catch the quaint spirit of the originals and satisfyingly restore to an interior the charming atmosphere of old Colonial days.

Because it is the product of craftsmen, using the old-time hand processes, Kensington furniture in all the great decorative styles retains the character and the decorative quality usually associated only with the antique.

Architects interested in completing the interiors they design with furnishings harmonious in both character and quality are cordially invited to avail themselves of the service of the Kensington Showrooms and personnel

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IN planning the interior furnishings of hotels, hospitals, country clubs and such buildings, The Elgin A. Simonds Company is able to render particular aid to the architect.

Special designs for the seating equipment will be submitted to harmonize with the interior. A Department of Interior Design is ready to give any possible service by way of assistance.

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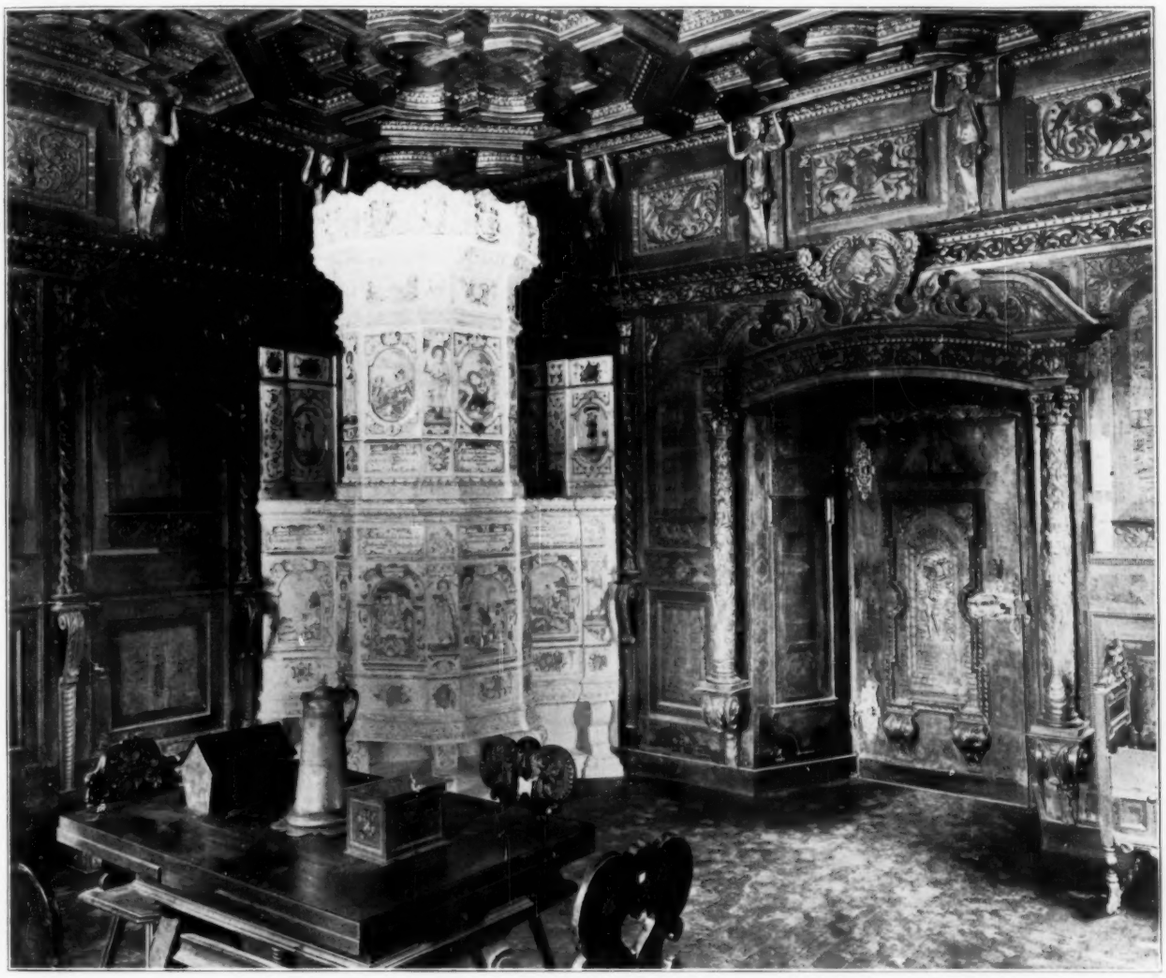

Famous "Walnut Room," Metropolitan Museum of Art. Taken from Castle at Flims, Switzerland. Walnut doors, ceiling, walls and furniture

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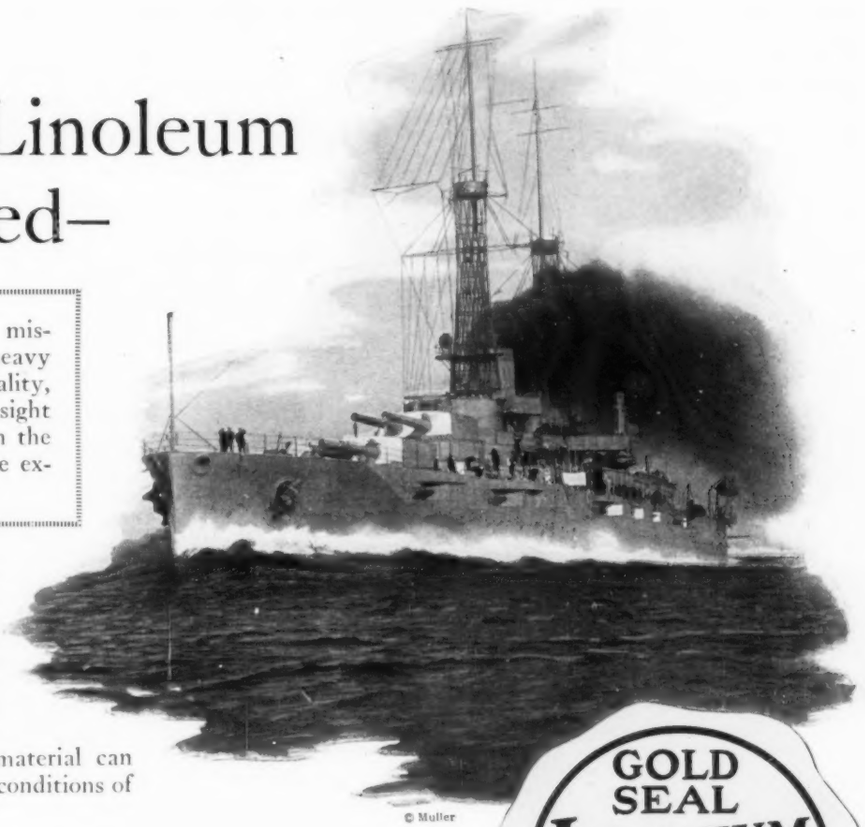
Battleship Linoleum Defined–

The term "Battleship" has been misapplied so widely to solid-color heavy linoleums, regardless of their quality, that its real meaning is often lost sight of, even among architects and in the floor-covering trade. Here is the explanation.



In the first place, the designation "battleship" linoleum is not now, and never has been, the trade name of any single manufacturer's product. Instead, it stands for a fixed and inflexible standard of quality—a standard so high that this material can withstand even the most severe conditions of battleship service.

"Made According to U. S. Navy Standard"

Genuine battleship linoleum—of U. S. Navy Standard—is made according to the exacting specifications of the Navy Department for linoleum to be used on the decks of naval vessels. It must prove up under various tests, some of which are: the bending test, indentation test, absorption test, and burlap test. Other requirements concern the necessity for highest grade materials, uniformity of color and finish, seasoning, etc.

Gold-Seal Battleship Linoleum is *genuine* battleship linoleum. It conforms in all respects to U. S. Navy Specifications and should not be confused with so-called battleship linoleums which do not conform to the Navy Standard.

Purchasers of *Gold-Seal* Battleship Linoleum are doubly protected—first, by the specifications prepared by the United States Navy Department, which insure the very highest quality; and, second, by our *Gold-Seal* Guarantee, which pledges "Satisfaction or Your Money Back."

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REMOVE SEAL WITH DAMP CLOTH

Gold Seal Battleship Linoleum is made in the three weights and thicknesses prescribed by Navy Specifications (heavy, ¼ inch; medium, 3/16 inch; and light, ⅛ inch), in rich restful shades of green, brown and terra cotta.

When you want to be sure of getting genuine battleship linoleum let your order read: "*Gold-Seal* Battleship Linoleum, made in accordance with Navy Department Specifications, 29 L1c. Sept. 1, 1916."

We will gladly supply free reprints of the U. S. Navy Specifications and samples of *Gold-Seal* Battleship Linoleum. To get the highest possible return for your investment you have only to make these the measure of quality for your purchase of linoleum.

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The Bristol Company has had an enviable reputation as manufacturers and reproducers of fine furniture.

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Chancel and Nave Looking from Sanctuary of Trinity Cathedral, Cleveland, Ohio. *C. F. Schweinfurth, Architect*

Sermons in Wood

THE architectural harmony of effect possible through the skillful handling in the church interior of chiseled stone and carved wood is well illustrated in Trinity Cathedral, Cleveland. The rich wood carving of the choir stalls and chancel is in entire keeping with the splendid Gothic design of the edifice itself.

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Armstrong's Linoleum
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Flooring Specification:

"All floors to be of Armstrong's B gauge Brown Jaspe (No. 11) Linoleum, as indicated on the drawings. The linoleum shall be cemented firmly in place to a lining of 1½-pound builder's deadening felt which has previously been pasted securely to the yellow pine sub-floor."

—Henry Boettcher, Architect

(See Sweet's, pages 441-445, for complete specifications.)

Living room in Residence of J. C. Feagley, Lancaster, Pa. Henry Boettcher, Architect.

Look for the CIRCLE "A" *trademark on the burlap back*

This Decorative Floor Saves Expense

"TWO years ago I had floors of Armstrong's Brown Jaspe Linoleum installed in my new residence as a part of the permanent construction," says the owner of this handsome Colonial home. "The linoleum has stood up under the wear very satisfactorily."

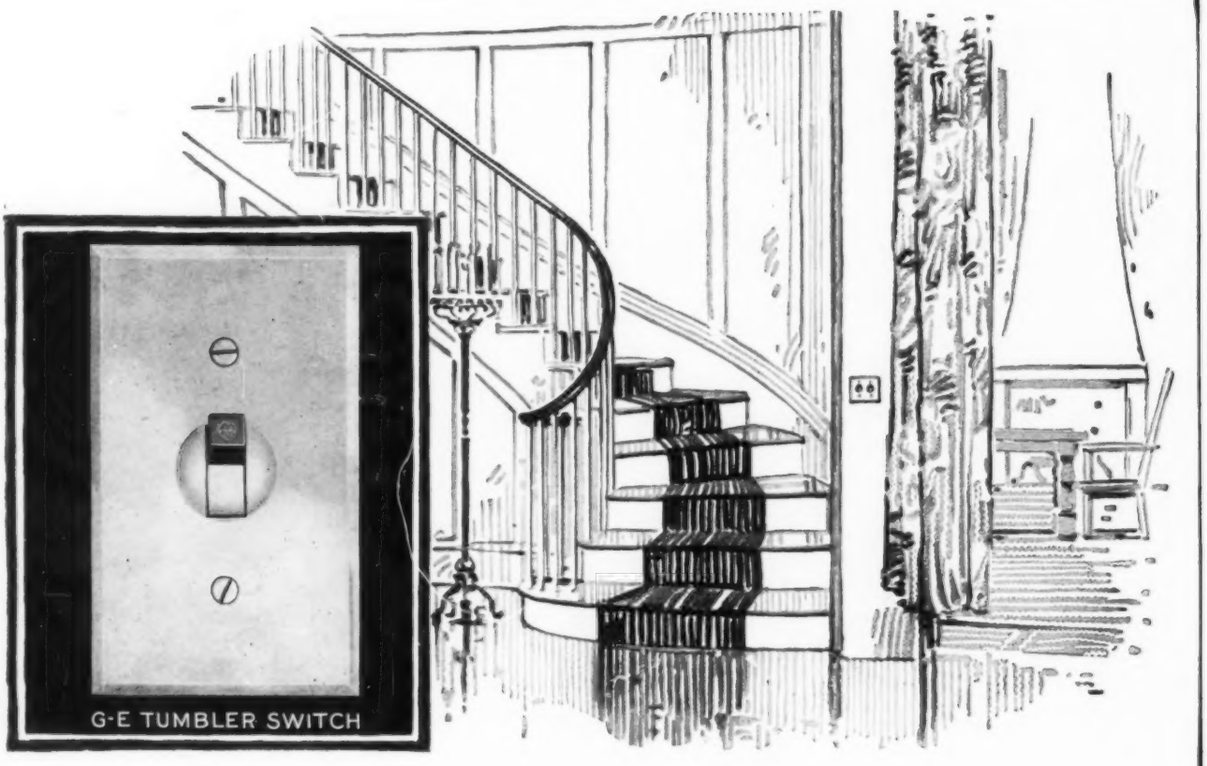
"I find that it is much easier to keep my linoleum floors in good condition than the stairs, which are of hardwood. The finish on the stair treads is so badly worn that I shall have to have them revarnished very soon, whereas the linoleum looks just as good as new. Occasional waxing and polishing keep my linoleum floors clean and bright."

Ease in cleaning and practically no maintenance expense are very definite virtues in linoleum floors. Installed when the house is built, over an inexpensive yellow pine underflooring, a plain or jaspe linoleum cuts flooring costs decidedly. Waxing and polishing keep a linoleum floor looking like new for years.

As to appearance—a major consideration in floors—picture a smooth, unbroken surface, with not one of the inevitable cracks of a wood floor. Decorators and architects choose their linoleum floors to harmonize with the color scheme. In the soft two-tone jaspes you may select brown, gray, green or blue; in plain linoleum there are brown, tan, dark gray, light gray, green, light blue, rose and black.

Samples of any coloring of jaspe or plain linoleum will be mailed free to any one interested. To see how architects and interior decorators are using linoleum floors, send for "Decorative Floors," a sixteen-page portfolio in colors, which shows a number of home interiors with linoleum floors.

Armstrong Cork Company, *Linoleum Division,* Lancaster, Pa.



Convenience of operation is just as important as convenience of location

YEARS of home building experience have taught where to place wall switches for greatest convenience. Years of electrical switch experience have taught a better, more simple switch mechanism.

The new G-E Tumbler Switch can be operated by the flip of a finger or the sweep of an elbow. One small lever which operates UP and DOWN, replaces the two push buttons of the old style wall switch.

Distinctly individual and neat in design, the new G-E Tumbler Switch adds to refinement by adding to convenience. Thoroughly representative of G-E quality, these new G-E Tumbler Switches are made in either flush or surface types and will harmonize with any decorative scheme, in home, hotel or office.

The General Electric Company will be pleased to send a sample of the G-E Tumbler Switch to any architect. Address Supply Dept., Schenectady, N. Y.

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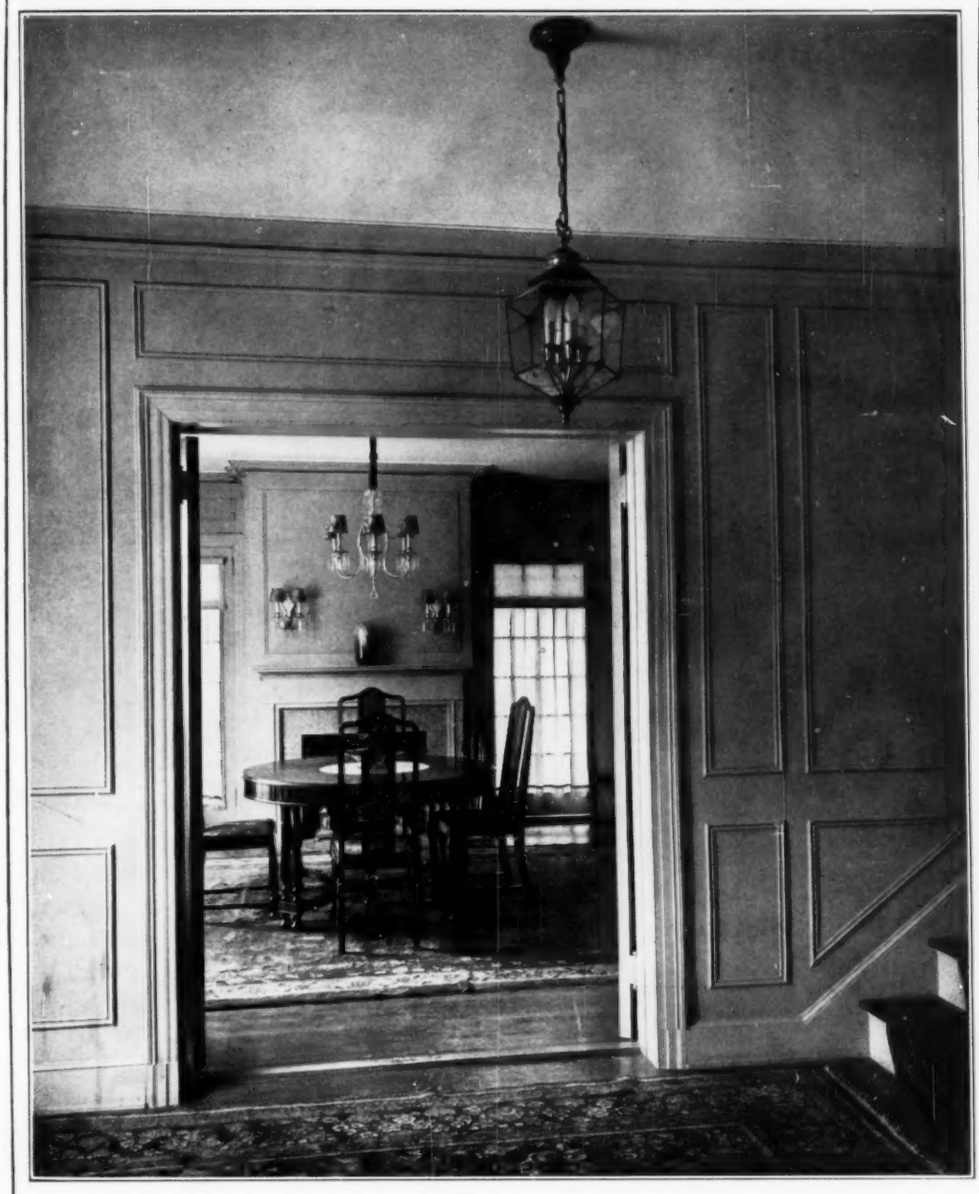

PURE whiteness—beautiful and with no glare—in a smooth, even coat that shows no brush marks or laps—that is the noteworthy feature of the painted surface of woodwork, walls and ceilings in this picture. For all white interiors use Dutch Boy White-Lead and Dutch Boy Flatting Oil. The resultant flat paint is economical because of its superior covering power. Does not crack or scale.

Write for Portfolio No.2 concerning interior painting

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JOHN T. LEWIS & BROS. CO., Philadelphia
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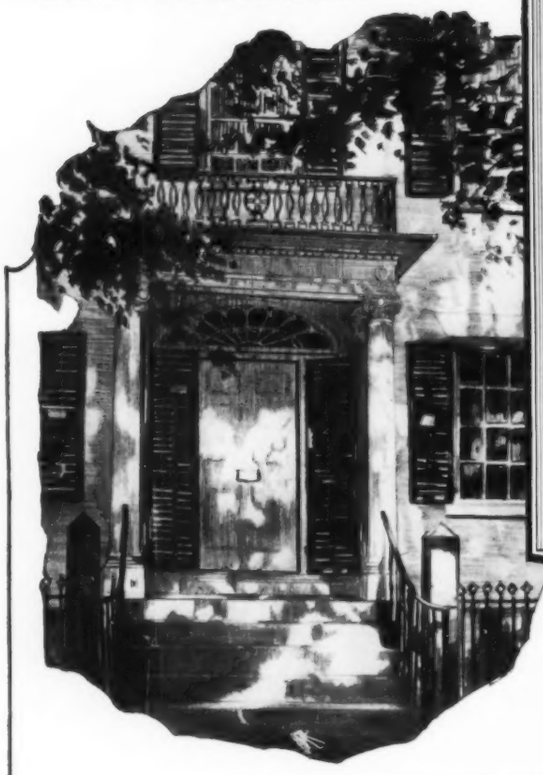
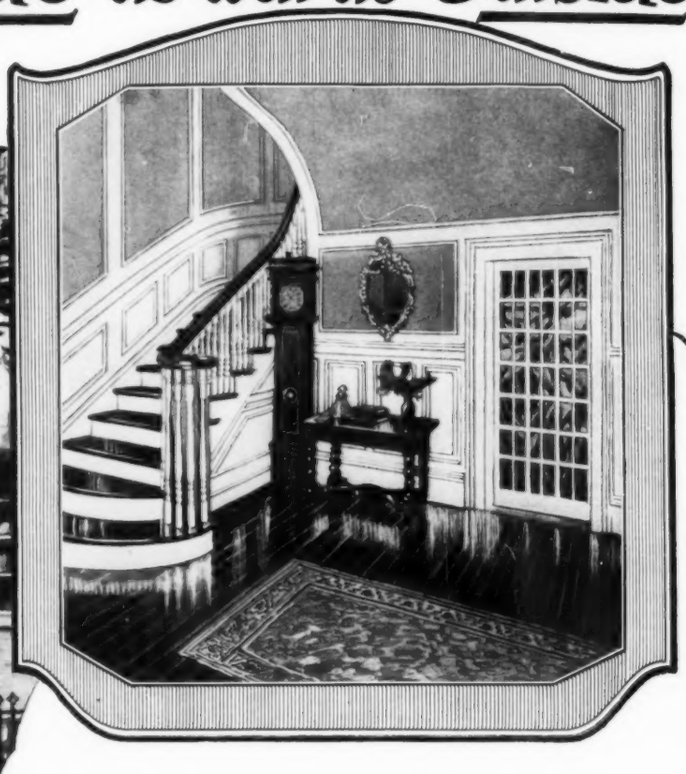
Dutch Boy Products for Interior Painting

"Sunshine Inside as well as Outside the Home"





BRINGING into the interior of homes you plan the warm, sunny cheer that plays upon the outer walls is largely a matter of the interior finish you specify.

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If the architect were specifying organs right along as he specifies plumbing, heating, lighting, he would know that there is one builder of pipe organs who has valuable experience to place at his disposal and a strong disposition to be helpful.

And the Estey Pipe Organ is one you can recommend with a clear conscience.

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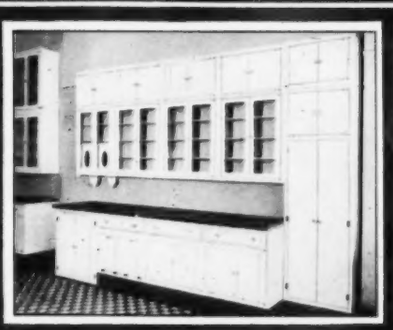
White House Sectional Steel Units fit into your construction plans—whether elaborate or simple—and give the satisfaction you want every part of the building you design to register on the mind of your client.

The gleaming, white-enameled steel units are roomy. The drawers are frictionless; the doors work easily; neither can jam, stick nor warp. Each has an individual catch. All hinges are concealed. There is nothing to catch dust. The storage bins are pest proof and moisture proof.



Architects will find many helpful suggestions, and just the units needed to fit into their plans in our catalogue and photographs showing actual installations of White House equipment in many fine residences. Send for them today.

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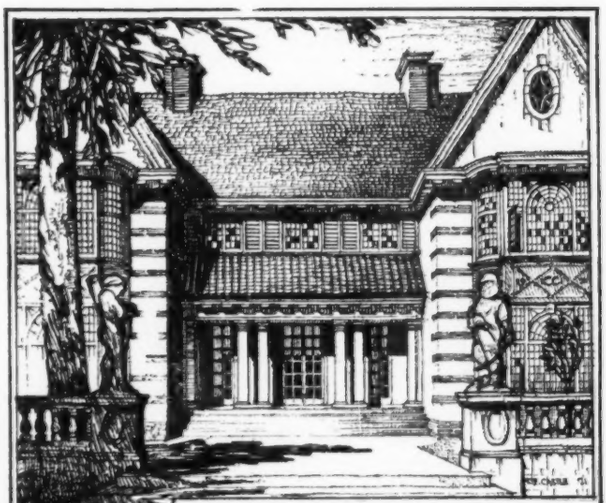

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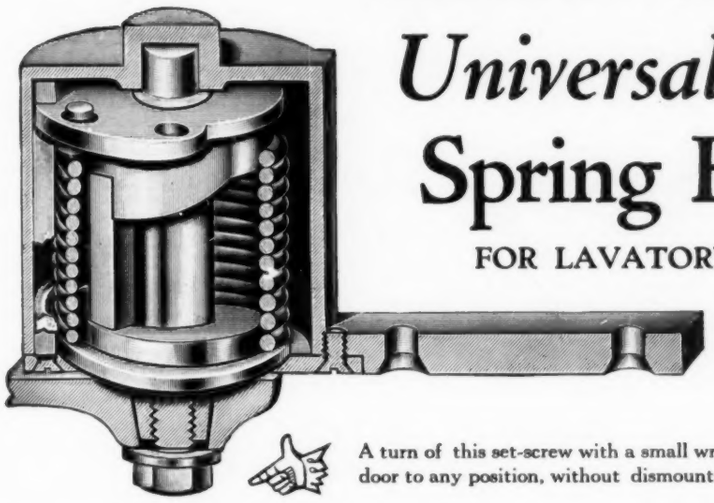


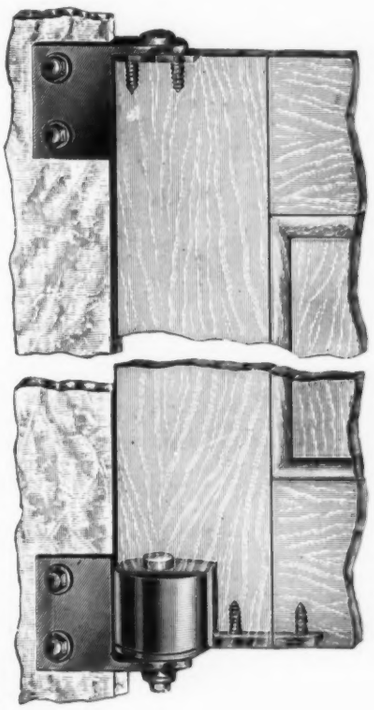
A turn of this set-screw with a small wrench adjusts door to any position, without dismounting the door.

RIGHT OR LEFT HAND—opening in or out—for marble, wood-jamb or pipe standard construction—in fact, for any type door where service is demanded and long life is essential.

That's why the LAWSON pivot spring hinge is rightly called the *Universal* hinge.

Of course, it is the *only* hinge for lavatory door use. Being hung top and bottom it can't sag—not ever—so long as the door lasts.

Notice the adjusting set screw in the illustration. A small wrench enables this door to be set for any position, open or closed, without dismounting the door. Adjustable spring tension. Special easy-closure springs developed for lavatory door use. Every detail carefully thought out and worked out to make the LAWSON hinge the best hinge you could possibly specify.



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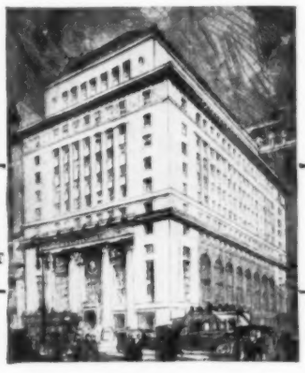

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SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 67*

Selected List of Manufacturers' Literature

FOR THE SERVICE OF ARCHITECTS, ENGINEERS, DECORATORS, AND CONTRACTORS

The publications listed in these columns are the most important of those issued by leading manufacturers identified with the building industry. They may be had without charge, unless otherwise noted, by applying on your business stationery to *The Architectural Forum*, 142 Berkeley St., Boston, Mass., or the manufacturer direct, in which case kindly mention this publication.

Listings in this Department are available to any manufacturer at the rate of $5 per listing per month.

ASBESTOS PRODUCTS

Asbestos Shingle, Slate & Sheathing Co., Ambler, Pa.

Ambler Asbestos Shingles. Catalog. 5½ x 8½ in. 40 pp. Illustrated.

Ambler Asbestos Corrugated Roofing and Siding. Catalog. 8½ x 11 in. 36 pp. Illustrated. Standard Purlin Spacing Tables.

Ambler Asbestos Corrugated Roofing and Siding. Catalog. 8½ x 11 in. 20 pp. Illustrated. Prices and specifications.

Ambler Asbestos Building Lumber. Catalog. 8½ x 11 in. 32 pp. Illustrated.

Engineers' Data Sheets. Catalog. 8½ x 11 in. 40 pp. Illustrated. Specifications and working sheets for Ambler Asbestos Corrugated Roofing and Siding.

ASH HOISTS—ELECTRIC AND HAND POWER

Gillis & Geoghegan, 544 West Broadway, New York, N. Y.

General Catalog. 8½ x 11 in. 20 pp. Fully illustrated. Contains specifications in two forms (with manufacturer's name and without). Detail ¼" scale for each telescopic model and special material-handling section.

The Man-Saving Load Lifter. 5⅞ x 8⅞ in. 8 pp. Illustrated. Describes G&G Telescopic and Non-Telescopic Hoists for handling material in factories.

BALANCES, SASH

Caldwell Mfg. Company, The, Rochester, N. Y.

Suggestion for the present-day Architect. Booklet. 6 x 9 in. 16 pp. Illustrated. Gives full-size dimensions and information for the purpose of writing specifications for Caldwell Sash Balances.

BOILERS—See Heating Equipment

BRICK

American Face Brick Association, 1151 Westminster Bldg., Chicago, Ill.

The Story of Brick. Booklet. 7 x 9¼ in. 55 pp. Illustrated. Presents the merits of face brick from structural and artistic standpoints. Tables of comparative costs.

The Home of Beauty. Booklet. 8 x 10 in. 72 pp. Color plates. Presents fifty designs for small face brick houses submitted in national competition by architects. Text by Aymar Embury II, Architect. Price 50c.

Bungalow and Small House Plans. Booklets. 8½ x 11 in. 50 pp. Illustrated. Four booklets, showing a variety of designs for small face-brick houses, covering 3, 4, 5, 6, 7 and 8 room houses. Price, 25c. each, $1 for the set.

A Manual of Face-Brick Construction. Booklet. 8½ x 11 in. Textbook on construction of the brick wall and various uses of face brick. 31 colored plates of brick houses with plans. Price, $1.00.

Architectural Details in Brickwork. Series 1, 2, 3. 8½ x 11 in. Very useful to the architect or draftsman. Sent free to architects applying on their office stationery. To others, $1.50.

BUILDING FINANCE

S. W. Straus & Co., 565 Fifth Ave., New York, N. Y.

The Straus Plan of Financing. Booklet. 8 x 6 in. 24 pp. Illustrated. Describes Straus system of co-operation with Architects, Builders, Engineers and Brokers in financing important building operations, also the making of construction loans on the larger and better properties in our large cities.

Forty Years Without Loss to Any Investor. Booklet. 8 x 5 in. 38 pp. Illustrated. A carefully prepared booklet for the thinking investor. Describes Straus bonds, the property upon which loans are made, and explains the Straus plan of safeguards which made possible the 40-year record.

BUILDING STONE—See Stone, Building

CEMENT

Atlas Portland Cement Company, 25 Broadway, New York, N. Y.

The Stucco House. Booklet. 8½ x 11 in. 96 pp. Illustrated. Contains valuable data on application of Portland Cement Stucco for those interested in building. Also photographic reproductions of beautiful and unusual stucco finishes, instructions and specifications.

Atlas Handbook on Concrete Construction. Book. 4¼ x 6½ in. 144 pp. Illustrated. Provides in convenient form practical information on concrete, plain and reinforced. Written from the practical rather than from the technical point of view. A valuable pocket text-book.

Carney's Cement Company, Mankato, Minn. Booklet. 8 x 10 in. 20 pp. Illustrated. Complete information on product, showing prominent buildings in which this cement has been used.

Louisville Cement Co., 315 Guthrie St., Louisville, Ky.

Brixment. Booklet. 7½ x 5 in. 16 pp. Illustrated. Brixment, what it is, what it does, how it does it and why.

Sandusky Cement Co., Dept. F, Cleveland, Ohio.

Medusa White Portland Cement, Stainless. Booklet. 8½ x 11 in. 48 pp. Illustrated.

Medusa Waterproof White Portland Cement. Booklet 6 x 9 in. 32 pp. Illustrated.

Medusa Review. 6 x 9 in. 18 pp. Illustrated. House organ issued bi-monthly.

CONDUIT

National Metal Molding Co., 1113 Fulton Building, Pittsburgh, Pa.

Bulletin of all National Metal Molding Products. In correspondence folder. 9½ x 11½ in.

Sherarduct. Circular. 5 x 8 in. Illustrated.

Flexsteel. Circular. 5 x 8 in. Illustrated.

CONSTRUCTION, FIREPROOF

National Fire Proofing Co., 250 Federal St., Pittsburgh, Pa.

Standard Fire Proofing Bulletin 171. 8½ x 11 in. 32 pp. Illustrated A treatise on fire proof floor construction.

Northwestern Expanded Metal Co., 934 Old Colony Building, Chicago, Ill

Fireproof Construction. Catalog. 6 x 9 in. 72 pp. Illustrated. Handbook of practical suggestions for architects and contractors. Describing Nemco Expanded Metal Lath.

Fire-proof Construction. Handbook. 6 x 9 in. 72 pp. Illustrated. Describing Kno-Burn expanded metal lath.

United States Gypsum Company, 205 West Monroe St., Chicago, Ill.

Pyrobar Gypsum Tile. Booklet. 8¼ x 11 in. 32 pp. Illustrated. Details and specifications for fireproof partitions.

Bulletins, 8½ x 11 in., containing details and specifications for Pyrobar voids for use with reinforced concrete joist floor construction; Pyrobar roof tile; and monolithic gypsum floors and roofs.

DAMPPROOFING

The Truscon Laboratories, Detroit, Mich.

Booklet. 5⅛ x 7¾ in. Illustrated. Contains descriptions and specifications of black dampproofing compounds for interior and exterior use.

DECORATIVE FABRICS

M. H. Rogers, Inc., 912 Broadway, New York, N. Y.

Samples of the following materials will be sent to architects upon request, to meet specific requirements:
Tapestries, velours, damasks, armures, cretonnes, tapestry panels, needlepoints, chair and sofa seats and backs.

DOORS, WINDOWS AND TRIM, METAL

Dahlstrom Metallic Door Company, 425 Buffalo Street, Jamestown, N. Y.

Architectural Catalog. 10 x 14 in. 46 pp. 11 sections. Illustrated. Catalog showing our regular styles and types of hollow metal doors and interior trim. Various types of frames and other architectural shapes also illustrated

Architectural Portfolio. 14 x 18 in. 30 pp. Illustrated. Portfolio of various designs and types of Dahlstrom doors. Drawings and details of each style or type. This is only sent free to reliable architects.

The Compound & Pyrono Door Company, St. Joseph, Mich.

Pyrono Handbook for Architects and Contractors. 8½ x 11 in. 16 pp. Contains full information regarding Pyrono Fireproof Veneered Doors and Trim, with complete details and specifications.
Pyrono details in sheet form for tracing.

The G. Drouvé Company, Bridgeport, Conn.

Daylighting the Factory. Booklet. 8½ x 11 in. 26 pp. Illustrated. Describes and illustrates the "Anti-Pluvius" puttyless skylight construction. Also contains interesting information on how to judge a skylight and the advantages of skylighting industrial plants.

DUMBWAITERS

Kaestner & Hecht Co., Chicago, Ill.

Bulletin 520. Describes K. & H. Co. electric dumbwaiters 8 pp.

Sedgwick Machine Works, 151 West 15th Street, New York.

Catalog and Service Sheets. Standard specifications, plans and prices for various types, etc. 4¼ x 8¼ in. 60 pp. Illustrated.

ELECTRICAL EQUIPMENT

Frink, I. P., Inc., 24th Street and 10th Avenue, New York, N. Y.

Catalog 415. 8½ x 11 in. 46 pp. Photographs and scaled cross sections. Specialized bank lighting, screen and partition reflectors, double and single desk reflectors and Polaralite Signs.

General Electric Company, Schenectady, N. Y.

Wires and Cables. Booklet. 8 x 10½ in. 85 pp. Illustrated. Four bulletins in a binder, describing wires and cables in general, conductors insulated with vulcanized rubber compound, varnished cambric and paper insulated cables, splicing materials and junction boxes for cable installations, armored cables.

Electric Fans. Folder. 6 pp. 3¼ x 6 in. Illustrated. Describes 1922 line of electric fans, giving catalog numbers, voltages and frequencies.

Reliable Wiring Devices. Catalog. 3 x 4⅝ in. 206 pp. Illustrated. Pocket catalog giving prices, schedule classifications and data for socket receptacles, switches, rosettes, cutouts and fuses for miscellaneous devices.

Lighting of Public Buildings. Bulletin. 6 x 9 in. 25 pp. Illustrated. Describes lighting of galleries, banks, museums, libraries, municipal, county and state buildings.

Kohler Co., Kohler, Wis.

Kohler Automatic Power and Light 110 Volt D. C. Booklet 5 x 7 in 32 pp. Illustrated. Describes a standard voltage automatic, electric power and light plant for isolated homes.

Simplex Wire & Cable Co., 201 Devonshire Street, Boston, Mass.

Simplex Manual Catalog and reference book. 6¾ x 4¼ in. 92 pp. Contains in addition to information regarding Simplex products, tables and data for the ready reference of architects, electrical engineers and contractors.

Smyser-Royer Co., 1609 Sansom St., Philadelphia, Pa.

Exterior Lighting Fixtures. Catalog F. 8½ x 11½ in. Illustrated. Illustrates lamp standards, brackets, lanterns and pier lights, for exterior use.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 67*

ELECTRICAL EQUIPMENT — Continued

Sprague Electric Works of the General Electric Company, 527 West 34th St., New York, N. Y.

Panel Boards and Cabinets. Catalog No. 47901. 8 x 10½ in. 70 pp. Illustrated. Panel Boards and Cabinets shown in this catalog have been selected after careful study of the general requirements. All appliances listed herein meet with the requirements of the National Board of Fire Underwriters.

Panel Circuits. Bulletin No. 47941. 8 x 10½ in. 8 pp. Illustrated. In addition to circuits for panel boards illustrated, a full line of circuits for panel boards having fuses inside branch circuit switches is also listed.

Panel Boards and Cabinets. Bulletin No. 47942. 8 x 10½ in. 16 pp. Illustrated. This bulletin covers the ever increasing demand for devices that provide maximum safety to the operator.

Dead Front Panels. Pamphlet No. 727. 5¼ x 7¾ in. 8 pp. Illustrated. A "Safety First" pamphlet covering Safety Panels and Dead Front Switchboards, for use in office buildings, factories, theaters, department stores, public buildings and in all places where the switches may be operated by persons ignorant of the changes of contact with current-carrying parts.

B. F. Sturtevant Company, Inc., Hyde Park, Boston, Mass.

Catalog No. 264. 8¼ x 10⅞ in. 54 pp. Illustrated. Gives description with diagrams of various types of motors, generators, generating sets, propeller fans, air heaters, and apparatus for special application.

ELEVATORS

Kaestner & Hecht Co., Chicago, Ill.

Bulletin 500. Contains 32 pp. Giving general information on passenger elevators for high buildings.

Otis Elevator Company, 11th Ave. & 26th Street, New York, N. Y.

Otis Push Button Controlled Elevators. Booklet. 6 x 9 in. 56 pp. Illustrated. Detailed description of Otis Push Button Elevators. Their uses in residences, stores, institutions, apartment houses, business offices and banks, etc.

Otis Gravity Spiral Conveyors. Booklet. 6 x 9 in. 56 pp. Illustrated. Gravity spiral conveyors for lowering packaged merchandise, boxed, cased and bundled goods in factories, warehouses, terminal buildings, etc.

Otis Electric Traction Elevators. Booklet. 9 x 12 in. 28 pp. Illustrated. Full details and illustrations of Otis geared and gearless traction elevators for all types of buildings.

Otis Escalators. Booklet. 6 x 9 in. 36 pp. Illustrated. Description of step and cleat type single and double file escalators (moving stairways).

Sedgwick Machine Works, 151 West 15th Street, New York.

Catalog and descriptive pamphlets. 4¼ x 8¼ in. 70 pp. Illustrated. Descriptive pamphlets on hand power freight elevators, sidewalk elevators, automobile elevators, etc.

FENCES

American Fence Construction Co., 130 West 34th St., New York.

Afco Factory Fences. Booklet. 9 x 12 in. 32 pp. Illustrated.

Residential Fences. Booklets. 7 x 2½ in. Illustrated. A series of booklets on residential fences consisting of photographs and brief descriptions.

The J. W. Fiske Iron Works, 78 Park Place, New York, N. Y.

Fences. Booklet. 8 x 10 in. 64 pp. Illustrated. Devoted to wrought iron railings, entrance gates and wire fencing.

Garden Furniture. Booklet. 7 x 10 in. 46 pp. Illustrated. Describes and illustrates ornamental iron settees, chairs, etc.

Page Steel and Wire Company, Bridgeport, Conn.

Page American Ingot Iron Fence. Booklet. 4 x 6½ in. 76 pp. Illustrated. Complete information, with diagrams, sizes, etc., for those interested in rust-resisting iron fence made of ARMCO iron.

Page Ornamental Fence for Lawn and Garden. Booklet. 6 x 9 in 12 pp. Illustrated. Description, with photographs and diagrams of lawn fence and gates. Complete instructions for ordering fence.

The Stewart Iron Works Company, Cincinnati, Ohio.

Book of Designs "B." 9 x 12 in. 80 pp. Illustrated. Book of designs illustrated from photographs of ornamental iron fence and entrance gates erected by us. Valuable to architects.

FIRE DOORS —See Doors, Windows and Trim, Metal

FIREPLACE EQUIPMENT

Covert Co., H. W., 137 E. 46th Street, New York, N. Y.

Hints on Fireplace Construction. Catalog. 5⅛ x 8½ in. 11 pp. Illustrated. Diagrams of construction and installation of Covert "Improved" and "Old Style" Dampers and Smoke Chambers. Also illustrations of Covert brass and wrought iron Fireplace Fittings.

FLOORING

Armstrong Cork & Insulation Co., 132 24th Street, Pittsburgh, Pa.

Linotile Floors. Catalog. 6 x 9 in. 40 pp. Color plates. Describes Linotile, a composition of ground cork, wood flour, linseed oil and various gums and pigments in tile form.

Armstrong's Cork Tile. Booklet 5 x 7 in. 16 pp. Illustrated in color.

Armstrong Cork Co. (Linoleum Dept.), Lancaster, Pa.

Armstrong's Linoleum Floors. Catalog. 8½ x 11 in. 54 pp. Color plates. A technical treatise on linoleum, including table of gauges and weights and specifications for installing linoleum floors.

Decorative Floors. Booklet. 11¼ x 15 in. 16 pp. Color plates.

Armstrong's Linoleum Pattern Book, 1922. Catalog. 3½ x 6 in. 168 pp. Color plates. Reproductions in color of all patterns of linoleum and cork carpet in the Armstrong line.

Quality Sample Book. Three books. 3½ x 5¾ in. Showing all gauges and thicknesses in the Armstrong line of linoleum and cork carpets.

Carter Bloxonend Flooring Co., 1303 R. A. Long Bldg., Kansas City, Mo.

Blox-on-end Flooring. Catalog. 3¼ x 6¼ in. 20 pp. Illustrated. Describing Blox-on-end Flooring and its adaptability to concrete, wood or steel construction; also various methods of installation.

Specification Sheet. 8½ x 11 in. 4 pp. Illustrated. Standard specifications in convenient form for architects and engineers as recommended by the American Institute of Architects.

FLOORING — Continued

Congoleum Company, Inc. (Linoleum Dept.), Philadelphia, Pa.

"Specifications for Laying Linoleum and Cork Carpet, according to the Congoleum Company's new method compiled after years of careful research."

Linoleum Service Sheet. Gives complete printed specifications as well as detail drawings showing application in specific cases such as thresholds, staircases, under radiators, etc.

Installation and Care of Battleship Linoleum. Booklet. 6 x 9 in. 24 pp. Illustrated. Instructions as to the uses of Battleship Linoleum, its laying and care.

Pocket Pattern Book. Descriptive Booklet. 3½ x 8½ in. 64 pp. Illustrated. Shows color reproductions of every grade and color of Gold Seal Battleship Linoleum, Inlaid Linoleum, Cork Carpet and also all patterns of the Gold-Seal Line.

The Marbleloid Co., 461 Eighth Ave., New York, N. Y.

The Universal Flooring for Modern Buildings. Booklet. 6¾ x 9¾ in. 32 pp. Illustrated. Describes uses and contains specifications for Marbleloid flooring, base, wainscoting, etc.

Marbleloid Flooring for Hospitals. Bulletin. 8½ x 11 in. 4 pp. Illustrated. Describes the especial features of this composition floor for hospital buildings.

Marbleloid Specifications. Booklet. 8½ x 11 in. 4 pp. Illustrated.

Muller Co., Franklyn R., Waukegan, Ill.

Asbestone Composition Flooring. Circulars. 8½ x 11 in. Description and Specifications.

The Nairn Linoleum Company, 179 Belgrove Drive, Kearny, N. J.

Linoleum. Booklet. 5½ x 8½ in. 68 pp. Illustrated in color. Reproductions in color of Inlaid, Printed, Plain and Battleship Linoleum; also Cork Carpets and Felt Base Floor Coverings.

Oak Flooring Manufacturers Association, 1014 Ashland Block, Chicago, Ill.

Modern Oak Floors. Booklet. 6⅛ x 9¼ in. 24 pp. Illustrated. A general book that tells the complete story on Oak Flooring.

Oak Flooring, How and When to Use it. Booklet. 3⅛ x 6¼ in. 16 pp. Illustrated. A small, technical book showing the general rules, standard thickness and widths, how to lay, finish and care for oak floors.

FLOOR HARDENERS

General Chemical Company, The, 25 Broad Street, New York, N. Y.

Making Concrete Wear Like Iron. Booklet. 4 pp. 8½ x 11 in. Illustrated. Describes Hard-n-tyte and its application to concrete floors.

Casehardening Concrete. Folder. 3¾ x 8½ in. 6 pp. Illustrated. Describes treatment of concrete surfaces with Hard-n-tyte so that they become literally "casehardened."

The Hard-n-tyte Specification. Booklet. 8½ x 11 in. 4 pp. Gives exact specifications for concrete floor finish.

Sonneborn Sons, Inc., L., 266 Pearl Street, New York.

Concrete and Lapidolith. Booklet. 5⅛ x 8⅛ in. 24 pp. Illustrated. Describing relation of Lapidolith chemical floor hardener to concrete construction.

Why Lapidolize? Booklet. 8½ x 11 in. 11 pp. Illustrated. Reasons why Lapidolith should be specified.

Lapidolith Specifications. Circular. 8½ x 10¾ in. 2 pp.

FLOOR HARDENERS (CHEMICAL)

The Truscon Laboratories, Detroit, Mich.

Agatex and Its Performances. Booklet. 8½ x 11 in. 16 pp. Describes use of Agatex Liquid Chemical for hardening cement floors.

FLOOR HARDENERS (METALLIC)

The Truscon Laboratories, Detroit, Mich.

Truscon Floor Hardener. Pamphlet. 7¾ x 5½ in. 18 pp.

FURNACES—See Heating Equipment

FURNITURE

Estey Organ Company, Brattleboro, Vt.

Pipe Organs. Complete specifications and full information furnished to the architect for pipe organ to be installed in any given residence, upon receipt of plans and other particulars.

Hampton Shops, 18 East 50th St., New York, N. Y.

Glimpses from Hampton Exhibits. Brochure. 16 pp. 5 x 7½ in. Illustrated. Shows examples of Hampton work and gives one an idea of their resources. Of interest to the client as well as to the architect.

Kensington Mfg. Company, 14 East 32nd St., New York, N. Y.

Photographs and full description of hand-made furniture in all the period styles furnished promptly in response to a specific inquiry.

Illustrated booklet indicative of the scope, character and decorative quality of Kensington furniture mailed on request.

Kewaunee Mfg. Company, Kewaunee, Wis.

Book No. 13. 6 x 9 in. 194 pp. Illustrated. Full description of Kewaunee Vocational Equipment for domestic science, demonstration dining rooms, fitting rooms, drafting rooms, manual training and shop-equipment, kindergarten and hospital equipment and dietetic tables.

Book No. 14. 6 x 9 in. 226 pp. Illustrated. Shows Laboratory furniture for chemistry, physics, biology, zoology, electrical and physiography laboratories, medical college, hospital laboratory equipment, industrial and commercial laboratory equipment. Engineering service gratis.

Charles P. Rogers & Co., Inc., 14-16 East 33rd St., New York, N. Y.

A Guide to Buying Quality Furniture, Beds and Bedding. Booklet. 4 x 6 in. Illustrated. Describes the manufacture of good furniture as compared with the ordinary kind.

Elgin A. Simonds Company, Syracuse, N. Y.

Furnishing the Home. 24 pp. 6 x 9 in. Illustrated. A treatise on modern interior decoration.

GLASS CONSTRUCTION

Mississippi Wire Glass, 220 Fifth Avenue, New York.

Mississippi Wire Glass. Catalog. 3⅞ x 8⅛ in. 32 pp. Illustrated. Covers the complete line.

GRANITE—See Stone, Building

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THE TRADEMARK of the American Brass Company identifies copper and brass products in which the highest skill in manufacture is combined with the accumulated knowledge and experience of more than a century.

The largest manufacturers of copper and brass products in the world, our plants are located with definite regard to the convenience of the consumer, making possible a service as prompt as it is dependable.

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Cleveland Cincinnati Detroit Chicago St. Louis San Francisco

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 68*

HARDWARE

Cutler Mail Chute Company, Rochester, N. Y.
Cutler Mail Chute Model F. Booklet. 4 x 9¼ in. 8 pp. Illustrated.

McKinney Mfg. Co., Pittsburgh, Pa.
McKinney Cabinet Hardware. Catalog. 6 x 9 in. 32 pp. Illustrated. Describes complete line of hardware for cabinet and furniture work.
McKinney Hardware for Sliding Doors. Booklet. 6 x 9 in. 18 pp. Illustrated. Describes different types of sliding door hardware.

Stanley Works, The, New Britain, Conn.
Wrought Hardware. Catalog. BJ10. 6½ x 10 in. Color plates. Shows all of the Stanley Works products made of steel from their own mills.
Eight Garages and their Stanley Garage Hardware. Booklet. 5 x 6¾ in. 32 pp. Illustrated. Illustrations and floor plans of eight typical garages that have been correctly equipped with Stanley Garage Hardware.
Ball Bearing Butts. Booklet. B8. 5 x 7¼ in. 32 pp. Illustrated. Concise description of various butts manufactured.
Stanley Specially Designed Garage Hardware. Booklet. B-50. 6 x 9 in. 24 pp. Illustrated. Detailed pictures and descriptions of various garage hardware equipment.

Vonnegut Hardware Co., Indianapolis, Ind.
Von Duprin Self-Releasing Fire Exit Devices. Catalog. 12F 8 x 11 in. 41 pp. Illustrated.
"Saving Lives." Booklet. 3½ x 6 in. 16 pp. Illustrated. A brief outline why Self-Releasing Fire Exit Devices should be used.

HEATING EQUIPMENT

American District Steam Company, North Tonawanda, N. Y.
Bulletin No. 150-AF. 6 x 9 in. 32 pp. Illustrated. Describes the Adsco System of Atmospheric Steam Heating and explains how it saves 20 to 30% of fuel cost. Tells how to figure radiation.
Catalog No. 21-AF. 6 x 9 in. 200 pp. Illustrated. Lists and describes the full line of equipment and devices manufactured for use on underground and interior steam mains, expansion joints, steam meters, condensation meters, traps, flange fittings, angle fittings, manhole curbs, alignment guides, etc.

Clarage Fan Company, Kalamazoo, Mich.
Catalog No. 52. 8½ x 11 in. 84 pp. Illustrated. Describes Clarage Kalamazoo Multiblade Fans and Heaters for use in schools, churches, hospitals and industrial plants. Engineering data, capacity tables and dimensions included.

James B. Clow & Sons, 534 S. Franklin Street, Chicago, Ill.
Gasteam. Catalog. 6 x 9 in. 16 pp. Illustrated. New radiator using gas for fuel.

Excelso Specialty Works, 119 Clinton St., Buffalo, N. Y.
Excelso Water Heater. Booklet. 12 pp. 3 x 6 in. Illustrated. Describing the new Excelso method of generating domestic hot water in connection with heating boilers. (Firepot Coil eliminated.)

Johnson Service Company, 149 Michigan St., Milwaukee, Wis.
Regulation of Temperature and Humidity. Booklet. 11¼ x 8½ in. 64 pp. Illustrated. Describes Johnson system of pneumatic, automatic regulation of temperature and humidity, and illustrates thermostats, valves, air compressors, dampers and other parts.
Johnson Electric Thermostats, Valves and Controllers. Booklet. 6½ x 3½ in. 24 pp. Illustrated. Excellent plates showing electric thermostats and controllers.

Kelsey Heating Company, James St., Syracuse, N. Y.
Booklet No. 5. 4 x 9 in. 32 pp. Illustrated. A dealers' booklet showing the Kelsey Warm Air Generator Method of warming and distributing air. Gives dimensions, heating capacities, weights, kind of coal recommended, and shows the mechanical and gravity system of heating homes, churches and schools.
Monroe Pipeless Booklet. 4½ x 8 in. 20 pp. Illustrated.
Monroe Tubular Heater. Booklet. 4½ x 8 in. 20 pp. Illustrated. General Booklet giving capacities, dimensions, weights, etc.
Syracuse Pipeless Booklet. 4½ x 8 in. 12 pp. Illustrated. General Booklet, giving sizes and capacities.

Kewanee Boiler Co., Kewanee, Ill.
Kewanee on the Job. Catalog. 8½ x 11 in. 80 pp. Illustrated. Showing installations of Kewanee boilers, water heaters, radiators, etc.
Catalog No. 73. 6 x 9 in. 35 pp. Illustrated. Describes Kewanee steel power boilers with complete specifications.

Minneapolis Heat Regulator Company, Minneapolis, Minn.
The Heart of the Heating Plant. Catalog. 6 x 9 in. 20 pp. Illustrated. Describing the Minneapolis Heat Regulator, its construction, application and operation for the automatic control of temperature where coal, gas, fuel oil or street steam is used.

Page Boiler Company, The Wm. H., 141 West 36th Street, New York, N. Y.
Page Boilers. Catalog. 4½ x 8 in. 84 pp. Illustrated. Descriptions with specifications of the Volunteer Round and Monarch Square Sectional Boilers; also the Monarch Up-Draft and Down-Draft Smokeless Boiler; with method for apportioning size of boiler and radiation, and other heating data.

Smith Co., H. B., 57 Main Street, Westfield, Mass.
General Boiler and Radiator Catalog. 4 x 7 in. 90 pp. Illustrated. Giving ratings, dimensions, capacities and working pressures.
Engineer's Data Ring Book. 4 x 7 in. 125 pp. Illustrated.
Architect's and Contractor's Binders. These binders are made up of 9½ x 11 in. folders of different kinds giving dimensions, price lists, and erecting directions on the different lines of our manufacture.

B. F. Sturtevant Company, Inc., Hyde Park, Boston, Mass.
Catalog No. 230. 8¼ x 10⅞ in. 132 pp. Illustrated. Gives description and data tables of various types of heaters, also of steam traps.
Bulletin No. 227. 8⅛ x 10 11/16 in. 28 pp. Blue prints of heating and ventilating layouts in public buildings, factories, etc.
Catalog No. 1015. Book on Heating and Ventilating, complete with installations and diagrams.

United States Radiator Corporation, Detroit, Mich.
The Complete Line. Catalog. 4¼ x 7¼ in. 255 pp. Illustrated. Contains important technical information of special interest to architects and heating engineers.
Capitol Smokeless Type Boilers. Booklet. 8½ x 11 in. 12 pp. Illustrated. Describing a new type of low-pressure heating boiler which burns soft coal without smoke.

HEAT REGULATORS—See Heating Equipment

HOISTS

Gillis & Geoghegan, 544 West Broadway, New York.
Hoists for Industrial Plants. Booklet. 6 x 8¾ in. 8 pp. Illustrated. Labor saving service in the lifting or lowering of lighter loads, through the use of G & G Telescopic and Non-telescopic Hoists.
Removing Ashes. Booklet. 6 x 8¾ in. 6 pp. Illustrated. Removing ashes from boiler room directly to wagon by electrically operated Telescopic Hoists.

HOLLOW TILE—See Tile, Hollow

INSULATION

Bishopric Manufacturing Co., 103 Este Ave., Cincinnati, Ohio.
For All Time and Clime. Booklet. 6 x 9 in. 48 pp. Illustrated Describing the use of Bishopric stucco base and Bishopric plaster base.

Philip Carey Co., The, Cincinnati, Onio.
Carey Asbestos and Magnesia Products. Catalog. 6 x 9 in. 72 pp. Illustrated.

United States Gypsum Company, 205 West Monroe St., Chicago, Ill.
Bulletin, 8½ x 11 in. Details and specifications for insulating roofs to prevent condensation.

United States Mineral Wool Co., 280 Madison Ave., New York, N. Y.
The Uses of Mineral Wool in Architecture. Booklet. 5¼ x 6⅝ in. 24 pp. Illustrated. Describes properties of mineral wool as insulation against heat, frost, sound. Specifications and section drawings for use as a fireproofing. Rule for estimate and cost.

KITCHEN EQUIPMENT

Wm. M. Crane Company, 16–20 West 32nd St., New York, N. Y.
VULCAN Gas Ranges and Appliances. Booklet. 5 x 8 in. 50 pp. Illustrated. Describes complete line, including VULCAN SMOOTH-TOP Compact Cabinet Gas Ranges for kitchens in the home.
VULCAN Gas Equipment for Hotels, Hospitals, Restaurants, etc. Booklet. 5 x 8 in. 45 pp. Illustrated. Equipment for heavy-duty cooking requirements, with information of value to architects in planning kitchens.

LATH, METAL AND REINFORCING

North Western Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.
Designing Data. Catalog. 6 x 9 in. 94 pp. Illustrated. Describes most efficient use of Econo Expanded Metal Reinforcing.
Formless Concrete Construction. Catalog. 6 x 9 in. 80 pp. Illustrated. Describes use of T-Rib Chanelath, a form and reinforcing for concrete.

LUMBER

Morgan Millwork Organization, Chicago, Ill.
Building With Assurance. Book. 8½ x 11 in. 408 pp. Illustrated. Valuable to architects for the Standardized Mill Work illustrated and described.
Price Supplement. Catalog. 4 x 8 in. 96 pp. Illustrated. Prices all illustrations in "Building With Assurance" and is valuable in connection with it or by itself.

MAIL CHUTES

Cutler Mail Chute Company, Rochester, N. Y.
Cutler Mail Chute Model F. Booklet. 4 x 9¼ in. 8 pp. Illustrated.

MANTELS

Arnold & North, Inc., 124 East 41st St., New York, N. Y.
Booklet. 5 x 6 in. Contains photographic reproductions of a variety of old English and Colonial mantelpieces with complete information as to sizes and prices.

Arthur Todhunter, 414 Madison Ave., New York, N. Y.
Mantels and Fireplace Equipment. Booklet. 8½ x 11 in. Illustrated. Separate sheet plates showing mantels installed and furnished, also andirons and grates grouped with suitable pieces, also lanterns, weather-vanes and hand-wrought hardware. All sizes and descriptions given on each plate.

MARBLE

The Georgia Marble Company, Tate, Ga. New York office, 1328 Broadway.
Why Georgia Marble is Better. Booklet. 3½ x 6 in. Gives analysis, physical qualities, comparison of absorption with granites, opinions of authorities, etc.
Convincing Proof. Booklet. 3½ x 6 in. 8 pp. Classified list of buildings and memorials in which Georgia Marble has been used, with names of Architects and Sculptors.

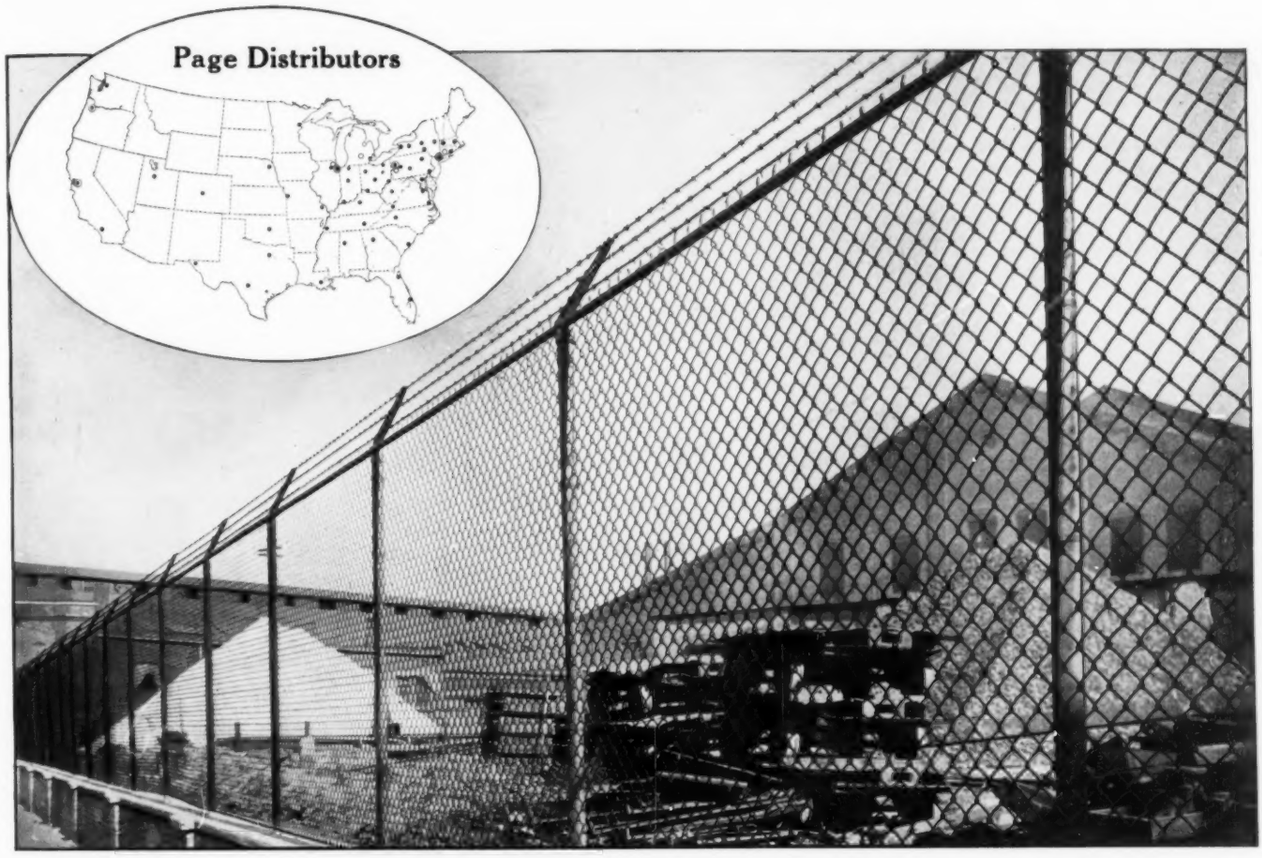
Tompkins-Kiel Marble Company, 505 Fifth Ave., New York, N. Y.
Loose leaf leather binder, 8 x 10 inches, containing 50 reproductions in color of imported and domestic marbles and stone for interior and exterior uses.
Bulletins, 9¾ x 12¾ in., illustrating buildings of various types in which Tompkins-Kiel Marble Company's imported and domestic marbles and stone have been used.

METAL LATH—See Lath, Metal and Reinforcing

METALS

American Brass Company, Waterbury, Conn.
Illustrated pamphlet describes the use and adaptability of extruded architectural shapes to meet the architect's design.

American Sheet & Tin Plate Co., Frick Building, Pittsburgh, Pa.
Reference Book. Pocket Ed. 2½ x 4½ in. 168 pp. Illustrated. Covers the complete line of Sheet and Tin Mill Products.
Apollo and Apollo-Keystone Galvanized Sheets. Catalog. 8½ x 11 in. 20 pp. Illustrated.
Research on the Corrosion Resistance of Copper Steel. Booklet. 8½ x 11 in. 24 pp. Illustrated. Technical information on results of atmospheric corrosion tests of various sheets under actual weather conditions.
Facts Simply and Briefly Told. Booklet. 8½ x 11 in. 16 pp. Illustrated. Non-technical statements relating to Keystone Copper Steel.
Black Sheets and Special Sheets. Catalog. 8½ x 11 in. 28 pp. Illustrated. Describes standard grades of Black and Uncoated Sheets, together with weights, bundling tables, etc.
Bright Tin Plates. Catalog. 8½ x 11 in. 16 pp.



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PAGE PROTECTION FENCE

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 70*

METALS — Continued

Bridgeport Brass Company, Bridgeport, Conn.
Seven Centuries of Brass Making. Booklet. 10½ x 8 in. 78 pp. Illustrated in color. A brief history of the ancient art of Brass Making and its early (and even recent) method of production—contrasted with that of the Electric Furnace Process—a twentieth century achievement of the Bridgeport Brass Company.
Tested High-Speed Brass Rod. Booklet. 10½ x 8 in. 16 pp. Illustrated. Short treatise on the manufacture of Brass Rod for use in Screw Machines, with particular reference to improvements originated by the Bridgeport Brass Company.
Handbook for Architects, Engineers & Superintendents. Book. 7½ x 4 in. 100 pp. Illustrated. Descriptive catalog of the products of the Bridgeport Brass Company, prepared especially for architects, engineers and superintendents, fully illustrated, and containing much valuable information.

Rome Brass & Copper Company, Rome, N. Y.
Descriptive Price List. 5 x 7 in. A leather-covered loose-leaf book listing sheets, tubes, rods, rolls, anodes, strips, extruded shapes, angles and channels, tapered tubes and hose pipes; molding, door-rail; commutator bars and segments; electrical copper bar, rivets and burs.

METAL TRIM—See Doors, Windows and Trim, Metal

MORTAR COLORS

Clinton Metallic Paint Co., Clinton, N. Y.
Clinton Mortar Colors. Booklet. 3½ x 6½ in. 8 pp. Illustrated. Complete description of Clinton Mortar Colors with color samples.

PAINTS, STAINS, VARNISHES AND WOOD FINISHES

Cabot, Inc., Samuel, Boston, Mass.
Cabot's Creosote Stains. Booklet. 4 x 8½ in. 16 pp. Illustrated.

S. C. Johnson & Son, Racine, Wis.
The Proper Treatment for Floors, Woodwork & Furniture. Booklet. 6¼ x 8¾ in. 32 pp. Illustrated in color. A treatise on finishing hard and soft wood in stained and enameled effects; also natural wood effects.
Portfolio of Wood Panels. 5½ x 10¾ in. 14 pp. A portfolio containing actual panels of finished woods. Also contains valuable information on finishing and re-finishing floors and woodwork.

National Lead Company, 111 Broadway, New York, N. Y.
Handy Book on Painting. Book. 5½ x 3¼ in. 100 pp. Gives directions and formulas for painting various surfaces of wood, plaster, metal, etc., both interior and exterior.
Red Lead in Paste Form. Booklet. 6¼ x 3½ in. 16 pp. Illustrated. Directions and formulas for painting metals.
Came Lead. Booklet. 8¾ x 6 in. 12 pp. Illustrated. Describes various styles of lead cames.
Cinch Anchoring Specialties. Booklet. 6 x 3½ in. 20 pp. Illustrated. Describes complete line of expansion bolts.

The Ripolin Company, Cleveland, Ohio
Ripolin Specification Book. 8 x 10¾ in. 12 pp. Complete specifications and general instructions for the application of Ripolin, the original Holland enamel paint. Also directions for proper finishing of wood, metal, plaster, concrete, brick and other surfaces.

Ruberoid Co., The (formerly the Standard Paint Co.), 95 Madison Avenue, New York, N. Y.
Preservative Coatings. Booklet. 6 x 9 in. 15 pp. Illustrated Presents in a concise manner the properties and uses of the Ruberoid Company's various paint preparations.

Smith & Co., Edward, P. O. Box 76, City Hall Station, New York, N. Y.
Architect's Hand Book. 4¾ x 7½ in. 24 pp. Specifications and suggestions for painting, varnishing, enameling, etc.

Sonneborn Sons, Inc., L., Dept. 4, 264 Pearl Street, New York.
Paint Specifications. Booklet. 8½ x 10¾ in. 4 pp.

The Truscon Laboratories, Detroit, Mich.
Architects' Specification Handbook. 8½ x 11 in. 34 pp. Complete specifications covering Waterproofings, Dampproofings, Oilproofings, Technical Finishes, Steel Paints and Varnishes.

PARTITIONS

Improved Office Partition Company, 25 Grant St., Elmhurst, L. I.
Telesco Partition. Catalog. 8¼ x 11 in. 14 pp. Illustrated Shows typical offices laid out with Telesco partitions, cuts of finished partition units in various woods. Gives specifications and cuts of buildings using Telesco.
Detailed Instructions for erecting Telesco Partitions. Booklet. 24 pp. 8½ x 11 in. Illustrated. Complete instructions, with cuts and drawings, showing how easily Telesco Partition can be erected.

The J. G. Wilson Corporation, 11 East 36th St., New York, N. Y.
Folding Partitions. Booklet. 8½ x 11½ in. 16 pp. Illustrated. Covers the field of folding partitions for churches, schools, hotels, clubs and public institutions.
Rolling Partitions, Hygienic and Disappearing Door Wardrobes. Booklet. 6 x 9 in. 32 pp. Illustrated. Describes rolling partitions, particularly in churches and schools, and wardrobes as installed in schools and public institutions.

PARTITIONS, WIRE

Page Steel & Wire Company, Bridgeport, Conn.
Page Standard Panel Partition. Booklet. 8½ x 11 in. 6 pp. Illustrated. Uses and advantages of Wire Partition, with Page Standard Panel Specifications. Valuable to architects.

PIPE

American Brass Company, Waterbury, Conn.
Illustrated pamphlet giving tables of weights and price-lists devoted to Brass and Copper Pipe in iron pipe and plumbers' sizes.

Clow & Sons, James B., 534 S. Franklin Street, Chicago, Ill.
Catalog "A." 4 x 6½ in. 706 pp. Illustrated. Shows a full line of steam, gas and water works supplies.

National Tube Co., Frick Building, Pittsburgh, Pa.
National Bulletin No. 11, History, Characteristics and Advantages of National Pipe. Catalog. 8½ x 11 in. 48 pp. Illustrated.

PIPE — Continued

Reading Iron Company, Reading, Pa.
Reading Genuine Wrought Iron Pipe in the Making and in Service. Bulletin No. 1. 8½ x 11 in. 32 pp. Illustrated. History of the Reading Iron Company. Origin of wrought iron—description of each process of manufacture of both buttweld and lapweld pipe—Reading Pipe in various fields.
Book of Standards. Booklet. 5 x 7 in. 48 pp. Illustrated. Complete tables showing dimensions, tests and list prices on each of the 552 different kinds of Reading Tubular goods. Two simple tests for distinguishing genuine wrought iron pipe.
The Painted Molecule. Booklet. 4 x 9 in. 8 pp. Illustrated. A brief, non-technical description of the reasons for the longer life of Reading Iron Pipe, with instances of actual service.
The Ultimate Cost. Booklet. 5¼ x 7¼ in. 24 pp. Illustrated in two colors. A comparison in actual figures of the initial cost and the ultimate cost of plumbing and heating systems in several kinds of homes.

PLUMBING EQUIPMENT

American Brass Company, Waterbury, Conn.
Benedict Nickel. Illustrated pamphlet descriptive of Benedict Nickel White Metal for high-grade plumbing fixtures.

A. P. W. Paper Company, Albany, N. Y.
The Onliwon Cabinet and Paper. Booklet. 5⅞ x 3⅜ in. 24 pp. Illustrated. Contains descriptions, illustrations and specifications of cabinets for serving Onliwon toilet paper and Onliwon paper towels.

Bridgeport Brass Company, Bridgeport, Conn.
Plumbing Supplies. Booklet. 10½ x 8 in. 20 pp. Illustrated Describes a few of the different plumbing supplies manufactured by the Bridgeport Brass Company.

Brunswick-Balke-Collender Co., 623 S. Wabash Avenue, Chicago, Ill.
Whale-bone-ite Seat. Booklet. 3½ x 6¼ in. 4 pp. Illustrated.
Whale-bone-ite Seat. Booklet. 3½ x 6¼ in. 8 pp. Illustrated.

Clow & Sons, James B., 534 S. Franklin Street, Chicago, Ill.
Catalog "M." 9¼ x 12 in. 184 pp. Illustrated. Shows complete line of plumbing fixtures for Schools, Railroads and Industrial Plants.

Crane Company, 836 S. Michigan Avenue, Chicago, Ill.
Crane Products in World Wide Use. Catalog. 5 x 9½ in. 24 pp. Illustrated.
Plumbing Suggestions for Home Builders. Catalog. 3 x 6 in. 80 pp. Illustrated.
Plumbing Suggestions for Industrial Plants. Catalog. 4 x 6½ in. 43 pp. Illustrated.

Eljer Company, 15 E. Van Buren St., Chicago, Ill.
The Standardized Sixteen. Booklet. 3¾ x 6¾ in. 32 pp. Illustrated Describes fully the complete Eljer line of standardized plumbing equipment, with diagrams, weights, measurements and copious illustrations.

Kohler Co., Kohler, Wis.
Kohler of Kohler. 5½ x 8 in. 48 pp. Illustrated catalog. Shows complete line of plumbing fixtures.

Maddock's Sons Co., Thomas, Trenton, N. J.
Highest Grade Standardized Plumbing Fixtures for Every Need. Catalog. 5 x 7½ in. 94 pp. Illustrated. Covers the complete line.
Bathroom Individuality. Booklet. 6 x 9 in. 28 pp. Illustrated. Showing view of complete bathrooms with complete descriptions of floor plans.
Specifications for plumbing fixtures. Booklet. 9 x 12 in. 8 pp. Tables of specifications for industrial buildings, schools, apartments, hotels, etc.

Speakman Company, Wilmington, Del.
Speakman Showers and Fixtures. Catalog. 4½ x 7½ in. 250 pp. Illustrated. Catalog of Modern Showers and Brass Plumbing Fixtures, with drawings showing layouts, measurements, etc.
Toned Up In Ten Minutes. Booklet. 7½ x 10½ in. 16 pp. Illustrated. Modern Showers and Washups for Industrial Plants, showing the sanitary method of washing in running water.

Wolff Manufacturing Company, 255 No. Hoyne Ave., Chicago, Ill.
Plumbing Suggestions. Catalog. 3¼ x 6 in. 50 pp. Illustrated. Illustrating, describing and pricing Wolff Quality Plumbing Fixtures for residential installation.

PUMPS

Goulds Mfg. Co., The, Seneca Falls, N. Y.
Set of Twenty Bulletins. 7½ x 10⅝ in. 12 to 32 pp. each. Illustrated. Covers complete line of power and centrifugal pumps for all services.
Catalog "K." 6 x 9 in. 216 pp. Illustrated. Covers complete line of smaller size pumps.

ROOFING

American Brass Company, Waterbury, Conn.
Copper Products for Roofing Purposes. Illustrated price-list devoted to copper products, including sheets and rolls, for fabricating into leaders, gutters, flashings, shingles, etc.

American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
Better Buildings. Cataiog. 8½ x 11 in. 32 pp. Describes Corrugated and Formed Sheet Steel Roofing and Siding Products, black, painted and galvanized, with directions for application of various patterns of Sheet Steel Roofing in various types of construction.
Copper—Its Effect Upon Steel for Roofing Tin. Catalog. 8½ x 11 in. 28 pp Illustrated. Describes the merits of high grade roofing tin plates and the advantages of the copper-steel alloy.

Philip Carey Co., The, Cincinnati, Ohio.
Architects Specifications for Carey Building Material. 8½ x 11 in. 48 pp. Illustrated.

Creo-Dipt Company, 1025 Oliver St., North Tonawanda, N. Y.
Architectural Service Sheets. 8½ x 11 in. Illustrated. Working drawings of construction, with standard specifications for design and construction of same.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 72*

ROOFING — Continued

Illinois Zinc Company, 280 Broadway, New York, N. Y.
Pure Rolled Zinc. (Corrugated and Plain Sheets.) Booklet. 3½ x 6¼ in. 8 pp. Illustrated. Facts regarding adaptability of zinc for roofing. Specifications of corrugated zinc sheets. Weights per square. Comparative gauge lists.
The Roof That's Always New. Booklet. 3½ x 6 in. 12 pp. Illustrated. Story of Illinois Zinc Shingles, their everlasting and artistic qualities. Information regarding a complete zinc roof, shingles, starting piece, valley, ridge and hip piece.

Ruberoid Co., The (formerly the Standard Paint Co.), 95 Madison Avenue, New York, N. Y.
Instructions for Laying Built-up Roofs. Booklet. 8½ x 11 in. Illustrated.
Ruberoid Facts Worth Knowing. Booklet. 6 x 9 in. 16 pp. Illustrated.
Ruberoid Strip-shingle. Booklet. 3½ x 6¼ in. 16 pp. Illustrated in color.
Ruberoid Unit-shingle. Booklet. 3½ x 6¼ in. Illustrated in color.

N. & G. Taylor Company, 300 Chestnut Street, Philadelphia, Pa.
Selling Arguments for Tin Roofing. Booklet. 6¼ x 9¼ in. 80 pp Illustrated. Describes the various advantages of the use of high grade roofing tin, gives standard specifications, general instructions for the use of roofing tin, illustrates in detail methods of application.

SAFETY TREADS

Universal Safety Tread Co., 40 Court St., Boston, Mass.
The Universal Safety Metal Tread. Booklet. 8½ x 11 in. 16 pp. Illustrated. Describes Safety Treads, with lead inserts in steel base, suitable for use on iron, wood or concrete stairs. Also the flat type, with "Alundum" surface, as well as special ladder treads for ships, power-house and engine-room open string stairways.

SEWAGE DISPOSAL

Kewanee Private Utilities, 442 Franklin St., Kewanee, Ill.
Specification Sheets. 7¾ x 10¾ in. 46 pp. Illustrated. Detailed drawings and specifications covering water supply and sewage disposal systems.

SHEATHING

Bishopric Manufacturing Co., 103 Este Ave., Cincinnati, Ohio
For All Time and Clime. Booklet. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric stucco base and Bishopric plaster base.

STEEL DRESSERS

Janes & Kirtland, 133–135 West 44th St., New York, N. Y.
The White House Line. Booklet. 7¾ x 5¼ in. 24 pp. Illustrated. Describes and illustrates in detail WHITE HOUSE Steel Dressers and some of the separate units. Also contains typical layout and list of some of our clients.
Photographs. 5½ x 3½ in. Views of actual installations in private residences, schools, etc., sent on request.

STONE, BUILDING

Harrison Granite Company, 200 Fifth Avenue, New York, N. Y.
Harrison Granite Company, Clientele. 3¾ x 8¾ in. 24 pp. Illustrated. A partial list of clients with illustrations of examples of monuments and mausoleums.

Indiana Limestone Quarrymen's Association, Box 766, Bedford, Indiana.
Volume 3. Series A-3. Standard Specifications for Cut Indiana Limestone work. 8½ x 11 in. 56 pp. Containing specifications and supplementary data relating to the best methods of specifying and using this stone for all building purposes.
Vol. 1. Series B. Indiana Limestone Library. 6 x 9 in. 36 pp. Illustrated. Giving general information regarding Indiana Limestone, its physical characteristics, etc.
Vol. 27. Series B. Designs for Houses of Indiana Limestone. 8½ x 11 in 32 pp. Illustrated. Being the best designs submitted in competition for a detached residence faced with Indiana Limestone conducted by *The Architectural Review.*

Tompkins-Kiel Marble Company, 505 Fifth Ave., New York, N. Y.
Loose leaf leather binder, 8 x 10 inches, containing 50 reproductions in color of imported and domestic marbles and stone for interior and exterior uses.
Bulletins, 9¾ x 12¾ in., illustrating buildings of various types in which Tompkins-Kiel Marble Company's imported and domestic marbles and stone have been used.

STORE FRONTS

Brasco Manufacturing Company, 5025 So. Wabash Ave., Chicago, Ill.
Brasco Catalog No. 26. 8½ x 11 in. 28 pp. Illustrated. Catalog illustrating and describing members of the Brasco and Brasco-Hester Construction. Includes copper-covered Brasco moulding and the Hester all metal moulding. The wood core of the Brasco has been creosoted and will last as long as the building.
Full-Size Details Brasco Copper Store Front Construction. 8¾ x 11 in. Complete in every particular. Show practical installation of the construction.
Full-Size Details Brasco-Hester Copper Store Front Construction. 8¾ x 11 in. This type is all metal or hollow. Has a dust regulator at the base of the plate which does not stick.

Kawneer Co., The, Niles, Mich.
Kawneer Solid Copper Store Fronts. Catalog. "K." 8½ x 11 in. 32 pp. Illustrated. Information about various members used in the pioneer Kawneer construction.
A Collection of Successful Designs. Catalog. 9¼ x 6½ in. 64 pp. Illustrated. Showing by use of drawings and photographs many types of Kawneer Solid Copper Store Fronts.

STORE FRONTS—Continued

Zouri Drawn Metals Co., B. J. 10, Chicago Heights, Ill.
Architects' Catalog. 8¾ x 11¾ in. 86 pp. Illustrated. Showing a true copy of the approval of the Underwriters' Laboratories. Showing a proper glazing specification, based on the Underwriters' Report.
Catalog B. J. 8 6 x 9 in. 68 pp. Illustrated. Key to Getting the People In.

STUCCO BASES

Bishopric Manufacturing Co., 103 Este Ave., Cincinnati, Ohio.
For All Time and Clime. Booklet. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric stucco base and Bishopric plaster base.

STUCCO, MAGNESITE

American Materials Company, 101 Park Avenue, New York; Weed Street and Sheffield Avenue, Chicago, Ill.
Elastica, the Stucco of Permanent Beauty. Catalog. 8½ x 11 in. 32 pp. Illustrated. Treatise on composition and application of Elastica Stucco.

Muller, Franklyn R. Co., Waukegan, Ill.
Everlastic Magnesite Stucco. Booklet. 8½ x 11 in.

United States Materials Co., Weed Street and Sheffield Avenue, Chicago, Ill. See American Materials Co.

TELEPHONE SYSTEMS

Federal Telephone & Telegraph Company, 1738 Elmwood Ave., Buffalo, N. Y.
Catalog No. 610. Booklet. 8½ x 10 in. 24 pp. Illustrated. Interior telephones for home, office, factory, hotel and apartment-house use.

TERRA COTTA

Atlantic Terra Cotta Co., 1170 Broadway, New York, N. Y.
Questions Answered. Booklet, 7½ x 5¼ in. 32 pp. Illustrated. A synopsis of questions most frequently asked by architects in relation to terra cotta, with brief but complete answers; contains many illustrations

National Terra Cotta Society, 1 Madison Avenue, New York, N. Y.
Standard Construction, Indexed, bound volume. 10½ x 16 in. 90 pp. 70 Illustrations. Standard forms of terra cotta construction with short article.
"The School." 10½ x 13½ in. 34 pp. 92 Illustrations. Types of school buildings with short descriptive articles. Volume I, brochure series.
"Better Banks." 10½ x 13½ in. Illustrated. Banks of various sizes, with short descriptive articles.
"Terra Cotta Defined." 10½ x 13½ in. Complete description of Terra Cotta and its uses.

Northwestern Terra Cotta Co., The, 2525 Clybourn Ave., Chicago, Ill.
Booklet. 8¼ x 11 in. 77 pp. Illustrated. Showing in a concise way the usefulness of terra cotta.

THERMOSTATS—See Heating Equipment

TILE, FLOOR AND WALL

Associated Tile Manufacturers, The, Beaver Falls, Pa.
Bring the Crowds to Your Market. Booklet. 8½ x 11 in. 16 pp. Illustrated. The use of Tile for the modern sanitary market.
Swimming Pools. Booklet. 8½ x 11 in. 32 pp. Illustrated. A handbook on swimming pools and their construction.

Norton Company, Worcester, Mass.
Alundum Safety Tile. Booklet. 5 x 8 in. 15 pp. Illustrated. Description of material and its installation.
Tests of Alundum Tile. Booklet. 5 x 8 in 18 pp. Illustrated. Describes its composition and proves its adaptability for its innumerable purposes.

TILE, HOLLOW

Hollow Building Tile Association, Dept. 1812, Conway Bldg., Chicago, Ill.
Handbook of Hollow Building Tile Construction. 8½ x 11 in. 104 pp. Illustrated. Complete treatise on most approved methods of hollow tile building construction and fireproofing.

National Fire Proofing Co., 250 Federal St., Pittsburgh, Pa.
Standard Wall Construction Bulletin 174. 8½ x 11 in. 32 pp. Illustrated. A treatise on the subject of hollow tile wall construction.
Industrial Housing Bulletin 172. 8½ x 11 in. 14 pp. Illustrated. Photographs and floor plans of typical workingmen's homes.
Natco on the Farm. 8½ x 11 in. 38 pp. Illustrated. A treatise on the subject of fire safe and permanent farm building construction.
Fireproof Buildings of Natco Hollow Tile. Booklet 8½ x 11 in. 16 pp Illustrated. Showing the use of Natco Hollow Tile for private residences.

VALVES

Crane Co., 836 S. Michigan Ave., Chicago, Ill.
No. 50 Steam Pocket Catalog. 4 x 6½ in. 775 pp. Illustrated. Describes the complete line of the Crane Co.

Gorton & Lidgerwood Company, 96 Liberty St., New York, N. Y.
Gorton Quarter-Turn Packing-Lock Valves. Booklet. 4¼ x 7¼ in. 32 pp. Illustrated. Describing a new type of valve for all systems of steam, hot water and vacuum heating.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 73*

VALVES—Continued

Jenkins Bros., 80 White Street, New York.
The Valve Behind a Good Heating System. Booklet. 4½ x 7¼ in. 16 pp. Color plates. Description of Jenkins Radiator Valves for steam and hot water, and brass valves used as boiler connections. Jenkins Valves for Plumbing Service. Booklet. 4½ x 7¼ in. 16 pp. Illustrated. Description of Jenkins Brass Globe, Angle Check and Gate Valves commonly used in home plumbing, and Iron Body Valves used for larger plumbing installations.

VENETIAN BLINDS

Burlington Venetian Blind Co., Burlington, Vt.
Venetian Blinds. Booklet. 4½ x 7½ in. 32 pp. Illustrated. Describes the "Burlington" Venetian blinds, method of operation, advantages of installation to obtain perfect control of light in the room.

VENTILATION

Clarage Fan Company, Kalamazoo, Mich.
Catalog No. 52. 8½ x 11 in. 84 pp. Illustrated. Describes Clarage Kalamazoo Multiblade Fans and Heaters for use in schools, churches, hospitals and industrial plants. Engineering data, capacity tables and dimensions included.

Globe Ventilator Co., Dept. P, Troy, N. Y.
Globe Ventilator's Catalog. 6 x 9 in. 32 pp. Illustrated.

WALL BOARDS

Carey Co., The Philip, Cincinnati, Ohio.
Carey Board for Better Building. Catalog. 6 x 9 in. 32 pp. Illustrated.

United States Gypsum Company, 205 West Monroe St., Chicago Ill.
Walls of Worth. Booklet. 8½ x 11 in. 24 pp. Illustrated. Describes Sheetrock, the fireproof wall board, its advantages and uses.

WATERPROOFING

Ruberoid Co., The, 95 Madison Ave., N. Y.
Impervite. Circular. 8½ x 11 in. 4 pp. Illustrated. An integral waterproofing compound for concrete, stucco, cement, mortar, etc.

Sandusky Cement Co., Dept. F., Cleveland, Ohio.
Medusa Waterproofing. Booklet. 6¾ x 9 in. 38 pp. Illustrated.

The Truscon Laboratories, Detroit, Mich.
Science and Practice of Integral Waterproofing. 4 x 9 in. 33 pp. Illustrated. Discusses why concrete requires waterproofing and properties an integral waterproofing must possess. Full specifications for waterproofing mass concrete, cement stucco and cement plaster coat.

WATER SOFTENERS

Permutit Company, The, 440 Fourth Ave., New York, N. Y
Permutit-Water softened to No (Zero) Hardness. Booklet. 8½ x 11 in. 32 pp. Describing the original Zeolite process of softening water to zero hardness An essential for homes, hotels, apartment houses, swimming pools, laundries, textile mills, paper mills, ice plants, etc., in hard water districts.

WINDOW HARDWARE

American Chain Company, Inc., Bridgeport, Conn.
American Sash Chain. Booklet. 3½ x 6 in. 8 pp. Illustrated. Describes and illustrates American Sash Chain and Sash Fixtures.

The Kawneer Company, Niles, Mich.
Kawneer Simplex Windows. Catalog. 8½ x 10½ in. 16 pp. Illustrated. Complete information, with measured details, of Kawneer Simplex Weightless Reversible Window Fixtures, made of solid bronze. Shows installations in residences and buildings of all sorts. Detail Sheets and Installation Instructions. Valuable for architects and builders.

Samson Cordage Works, Boston, Mass.
Catalog. 3½ x 6¾ in. 24 pp. Illustrated. Covers complete line.

Smith & Egge Mfg. Co., The, Bridgeport, Conn.
Booklet. 6¾ x 9 in. 42 pp. Illustrated. Covers a complete line of chains, hardware and specialties.

WINDOWS, CASEMENT

Crittall Casement Window Co., 2703 East Atwater Street, Detroit, Mich.
Catalog No. 18. 9 x 12 in. 56 pp. Illustrated.

Hoffman Mfg. Co., Andrew, 900 Steger Building, Chicago, Ill.
Hoffman Casements. Architects' Portfolio. 8½ x 11 in. Loose-leaf. Large scale working details for mill-work and installation.
F. S. Details 20 x 23 in. and 15 x 22 in. Working details for mill-work and installation.
Hoffman Casements Catalogue. 7 x 8½ in. 16 pp. Illustrated.

Hope & Sons, Henry, 103 Park Avenue, New York.
Catalog. 12¼ x 18½ in. 30 pp. Illustrated. Full size details of outward and inward opening casements.

International Casement Company, Jamestown, N. Y.
International Casements in Banks and Public Buildings. Booklet 8½ x 11 in. 24 pp. Illustrated. Contains photographs and measured drawings of actual installations of International Casements furnished in banks and public buildings, together with details of window sections and photographs of hardware.

WIRE

Page Steel & Wire Company, Bridgeport, Conn.
American Ingot Iron Wire, Electrical and Mechanical. Booklet. 4 x 6½ in. 32 pp. Illustrated. Presents in convenient form data and tables pertaining to the properties of American Ingot Iron Wire. Listed in parallel columns for ready comparison with other commercial wire.

WOOD — See Lumber

Plates of Colonial Architecture

Measured Drawings and Photographic Illustrations

Contained in three paper bound books published in recent years from specially made photographs and drawings. They were originally sold at $1.00 each, but a limited number now available are priced at 50 cents each. They are of practical value to anyone interested in Colonial work. The subjects are as follows:

Interiors of Old Houses in Salem and Vicinity

Contains twenty-five full-page photographic illustrations of details selected from the finest old houses of this district, showing many of the exquisite mantels, stairways, etc., designed by Samuel McIntyre that are so justly famous.

Old Colonial Brick Houses of New England

Twelve typical New England houses are shown in full-page photographic illustrations and measured drawings of the front elevations. The exquisite proportion and fenestration are easily made available through these plates.

Twelve Old Houses West of Chesapeake Bay

This book shows a selection of the best smaller houses along the Virginia rivers. Particularly valuable in illustrating the picturesque dormers, roof lines and chimneys characteristic of this region. Illustrations and measured drawings.

Bound in paper covers, printed on one side of the sheet only, size 8 x 10½ inches. Sent postpaid to any address in the United States upon receipt of price. 50 cents per copy.

Rogers and Manson Company
Architectural Publishers
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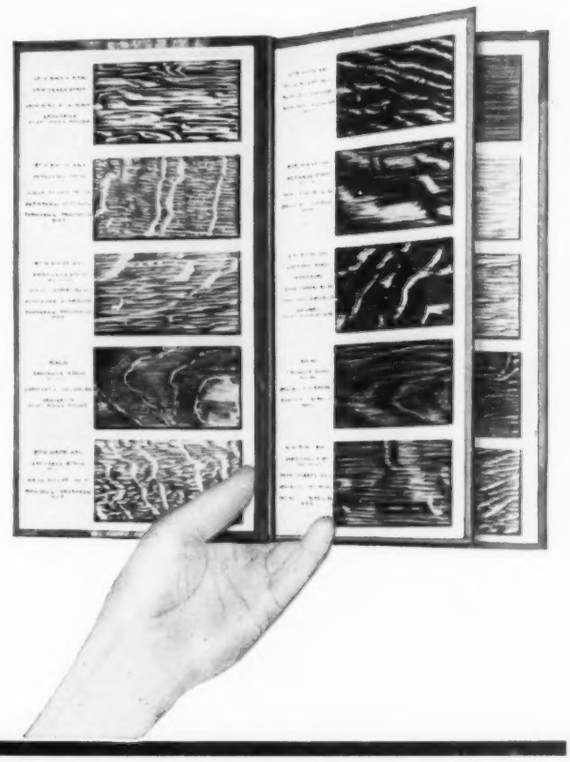
FREE -- This Beautiful Portfolio *of* Wood Panels *for* Architects



THIS portfolio shows on various woods the many beautiful effects obtainable with Johnson's Artistic Wood Finishes. It is handy for architects to show their clients when selecting woods and finishes. Every portfolio costs $2.00, so we cannot afford to send them out generally, but we are glad to furnish them gratis to interested architects. Write for one for your files.

JOHNSON'S WOOD DYE

Johnson's Wood Dye is an oil dye for artistically coloring wood. It is very easy to apply—goes on evenly and quickly, without a lap or streak—penetrates deeply—brings out the beauty of the grain without raising it—dries in four hours—and does not rub off or smudge. Any brush hand can apply it with satisfactory results. With Johnson's Wood Dye inexpensive soft woods can be finished so they are as beautiful and artistic as hardwood.

Our illustrated book, "The Proper Treatment for Floors, Woodwork and Furniture," contains practical information concerning wood finishing. It tells just what materials to use and how to apply them. Contains accurate specifications for finishing woods with *Johnson's Artistic Wood Finishes*—includes color cards and gives covering capacities. It will be sent FREE to architects. Request it when writing for your portfolio of wood panels.

See pages 1260-1261 Sweet's for Architect's Specifications on Johnson's Artistic Wood Finishes.

S. C. JOHNSON & SON

"The Wood Finishing Authorities"

Racine **Dept. AF-6** **Wisconsin**

Apartment House, No. 25 Fifth Avenue, N. Y.
Rouse & Goldstone, Architects, N. Y.

Sound-Proof Partitions Only 3 Inches Thick

New York, March 1, 1921

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New York City

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We are pleased to acknowledge that the results obtained in the Apartment Building at the above address from the use of your Insulating Quilt for sound deadening have been highly satisfactory.

Your 2-ply Quilt was hung in the center of double partitions between adjoining apartments, which construction has minimized the transmission of sounds from one apartment to another in a very satisfactory manner.

Our experience with your material in this building impels us to say that we would unhesitatingly use it in our future work of this character.

Very truly yours,
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This complete demonstration of the efficiency and economy of

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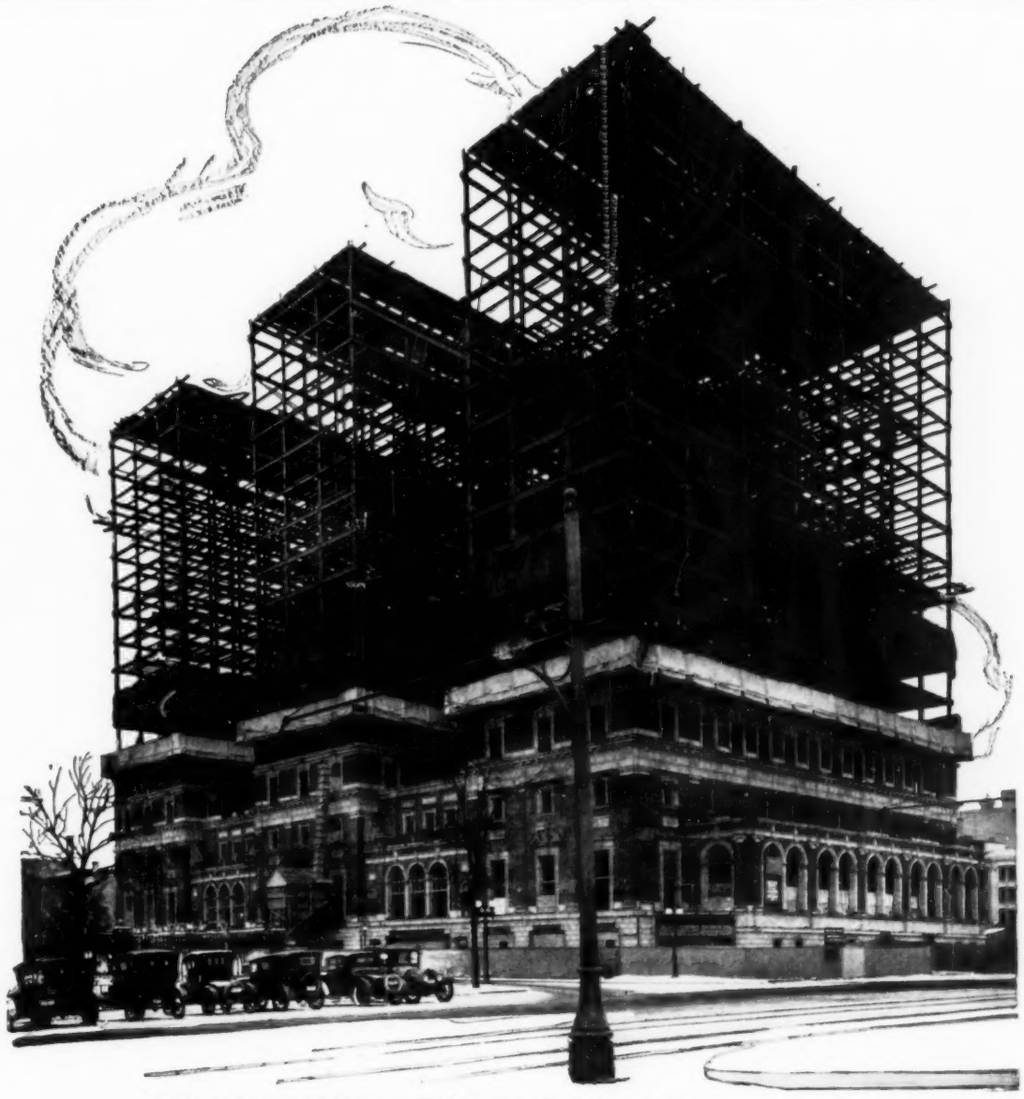

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The P-A-X Is Not Merely a Telephone

WHEN you specify P-A-X equipment for your clients' needs, you are *not* recommending a "toy" system. The equipment you place at his disposal is exactly the same as that now being used in an increasingly large number of city exchanges all over the world. Long distance calls across continents pass through the same type of transmitter and receiver and are automatically switched by equipment consisting of simply a larger group of units identical to those serving your client.

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STUCCO is popular—as a finish for new structures—as a method of improving old ones. The inevitable result has been a big crop of just-as-good's, each claiming a special advantage.

But the fact remains that for permanent satisfaction there is just one stucco—Portland Cement stucco. It is as permanent as concrete because it *is* concrete. And with it are obtainable, through trowelling or floating in an unusual manner textures possible with no other material. These textures are permanent in themselves—no pebble dash is needed for protection.

Atlas White Portland Cement, properly used, makes good stucco, makes beautiful stucco, makes permanent stucco. If you haven't our book—"The Stucco House," ask for a copy.

This photograph of a strip 36 inches high from an actual wall shows a finish placed with a sweep of the trowel, using more pressure on one end than the other. The direction of the motion is varied from time to time.

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Waterproofed!

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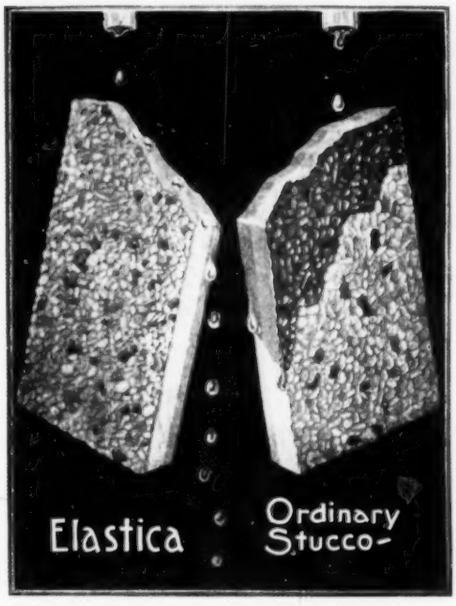

MAKE THIS SIMPLE TEST

Obtain a sample of Elastica; apply water to it in this manner or in any other way. Then apply the same test to other stuccoes. Satisfy yourself that Elastica alone is waterproofed.

— not a single drop of water can penetrate it. It is absolutely impervious to moisture of any kind all the way from the exterior surface back to the key. That is why Elastica buildings are never disfigured by water blemishes and stains. Both first coat and finish coat are permanently waterproofed. For that reason, when Elastica is used, wood backgrounds will not expand, contract or buckle. Metal lath will not rust or stain. Alkali or saltpeter from brick or tile cannot effloresce or stain through Elastica.

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Elastica is the only magnesite stucco known that is shipped to the builder "*Complete in a sack*," insuring absolute security in results obtained.

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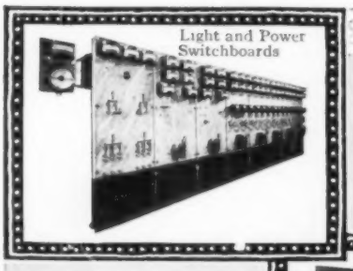
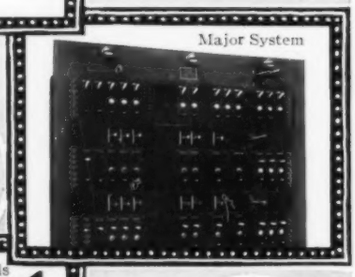
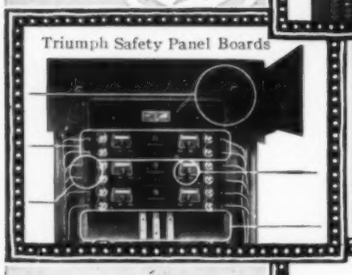
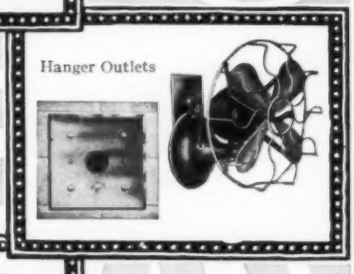
ELASTICA

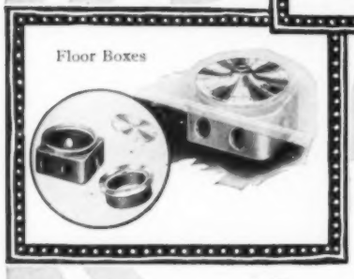
THE IDEAL EXTERIOR WALL COVERING











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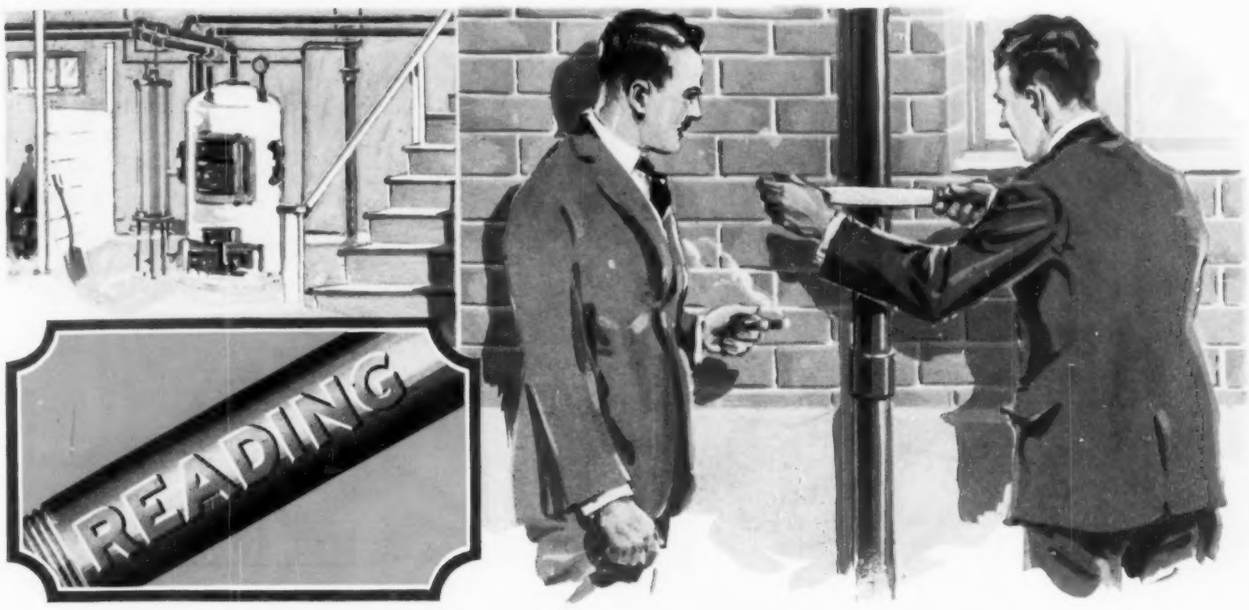

It Will Pay You to Know This Test For Genuine Wrought Iron Pipe

SEND FOR THIS BOOKLET

It contains instructive information on pipe costs and the best installation methods. Also literature on Reading Cut, Nails, which hold and prevent squeaking floors.

Sometime you will want to check up on your own specifications. You will want to know how to distinguish Reading Genuine Wrought Iron Pipe.

Your best safeguard is a written guarantee from your contractor that READING Pipe will be used exclusively, for Reading Iron Company manufactures pipe from the highest grade of guaranteed genuine wrought iron only.

Look for "Reading" which is rolled on every length of pipe. If, however, these rollmarks are cut off, the following simple test is recommended:

File a bright, smooth surface on the piece of pipe to be inspected. If the bright surface shows fine hair lines running parallel to the length of the pipe it is wrought iron. If, on the other hand, the surface does not show these lines the material is steel.

The siliceous slag content makes Reading Genuine Wrought Iron Pipe highly resistant to corrosion, and causes it to last two to three times longer than the best steel pipe. A remarkably low ultimate cost is inevitable. That's why today "Reading" is installed in high class buildings throughout the country.

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World's largest makers of Genuine Wrought Iron Pipe

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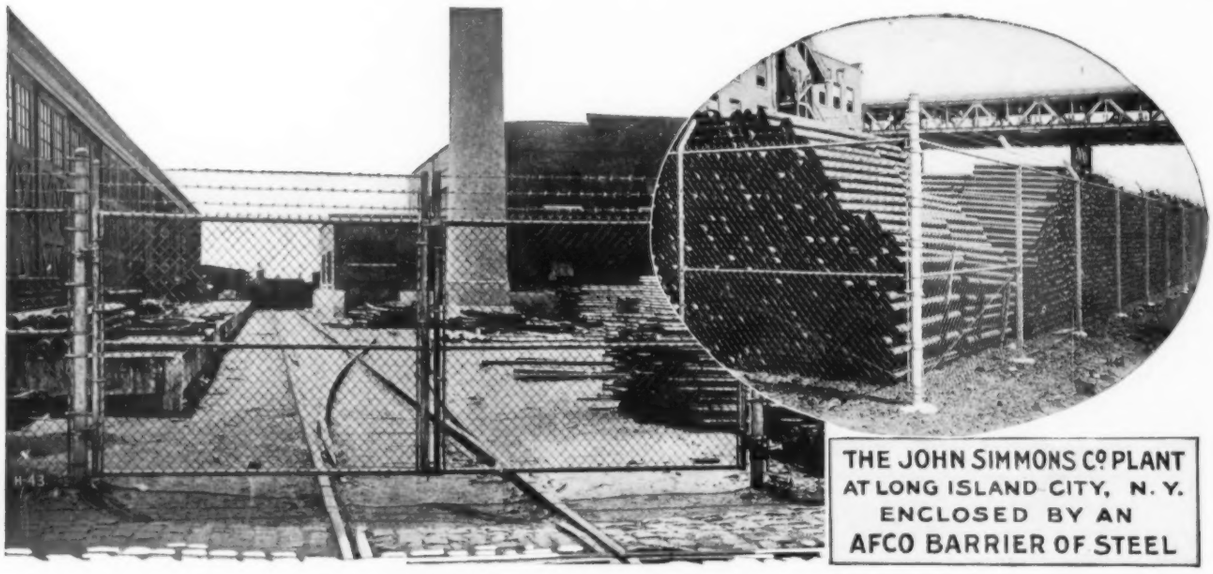

THE JOHN SIMMONS Co PLANT
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AFCO BARRIER OF STEEL

Fence
Is Part of the Plant

No. 2—It stops theft, both from sources outside and inside the plant—

From the outside, because the thief can't get in;

From the inside, because you control the exit from your plant.

It makes the storage of material in the yard safe—right up to the fence line.

This is vividly portrayed by the illustration of the plant of the John Simmons Co., Long Island City, N. Y.

And this security against theft and pilfer is obtained at an astonishingly small cost compared with losses which many unenclosed plants sustain in the course of the year.

The sturdy design of Afco Fences and Gates, their materials and the manner of their erection, were considered sufficiently appealing to make them the choice in this case.

To provide storage space, reduce fire hazard, prevent theft, control traffic and eliminate trouble, protective fence is an essential part of the plant.

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The walls of the Missouri Pacific R. R. Station at Little Rock, Arkansas, are laid up in Carney —"*The Bond that Guarantees the Wall.*"
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IF CARNEY binds the brick it guarantees your wall. Its use is a surety that your wall will be exactly as you planned it. Carney mortar guarantees supreme strength and durability.

The slower set of Carney gives mortar a greater adhesive power, which, in turn, produces a stronger union. The mortar becomes harder than the brick it joins—as hard even as the hardest shale brick. In tearing down a Carney laid wall you drill brick because you can't crack the mortar. Carney is your assurance of permanence.

Carney guarantees the wall because the simple formula—one part Carney—three parts sand—no lime—prevents mixing mistakes and carelessness. Mistakes and adulteration are immediately noticed in the working properties of the mortar, by the men on the wall.

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Carney is the choice of leading architects. They are particular to specify it for all classes of brick or tile construction including wall bearing buildings.

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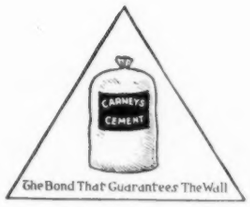
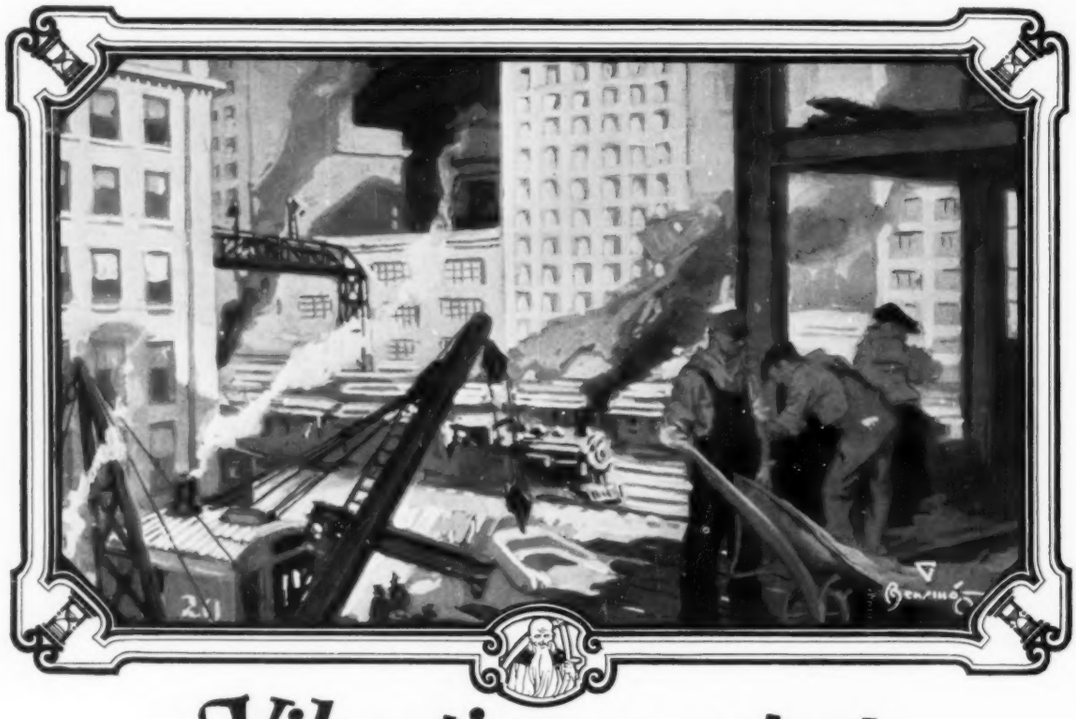
Specifications: 1 part Carney, 3 parts sand; no lime



CARNEY'S CEMENT
For Brick and Tile Mortar

BRIXMENT



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CATCHING the rumbles and jars of passing traffic and constantly transmitting them through its airy skeleton of steel and rivets, a building demands the utmost of strength and endurance in the mortar which maintains the solidity of its walls.

For such mortar, the exceptional qualities of BRIXMENT make it the choice of many progressive architects. Its high calcium silicate content undergoes hydration to produce *tremendous final strength*—and a crushing strength almost equal to that of the brick itself. Its plasticity and smoothness make warm friends of the bricklayers. Its oily constituent repels water, minimizing the danger of freezing in cold weather.

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It tells why BRIXMENT means stronger and more durable masonry and how it can save time, labor and money

And the architect who uses BRIXMENT knows that his mortar will be of the proper strength because the composition of BRIXMENT is definite and constant. Hence there is no uncertainty as to properly measured ingredients, as in the case of old-fashioned lime-cement mortars.

And, finally, it is *surprisingly economical*. No wasteful slaking; easily and efficiently spread because smooth and plastic; mixed in desired quantity wherever needed and used at once; requires less mortar color.

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Proper methods for the erection of Copper are given. There are a number of full-page illustrations showing the Copper roof applied to various types of buildings. And, wherever it has been thought helpful, the text has been illustrated with figures.

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We are anxious that every architect, engineer and contractor interested shall have a copy of "Copper Roofing," and will send a copy promptly on request. There is of course no charge.

TABLE OF CONTENTS

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Weights of Various Roofing Materials as Compared with Copper

Copper Roofs

Batten or Wood Rib Method
Standing Seam Method — Flat Copper Roof
Soldering, Backing, Sheathing
Thickness of Sheets
Fundamentals in
Sheet Copper Roof Construction
Copper Shingles
Decorative Effects and How to Obtain
Flashings

Copper Roof Specifications

Solder — Flux — Fastenings
Precautions — Sheathing Wood
Paper — Finish
Batten Roofing — Standing Seam Roof
Flat Seam Roof

Other Copper Specifications

With or Without Copper Roof
Flashings — Reglets — Valleys
Gutters — Hanging Gutters
Conductors — Tubes and Outlets
Skylights — Cornices
Copper-covered Walls

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RELIANCE FIREPROOF PRODUCTS

National Surety Building, Washington and Albany Streets, New York City. Arthur C. Jackson, architect. George A. Fuller Company, building contractors

The National Surety Building is typical of the modern type of business structures equipped with Reliance Fireproof Products. This notable building has Reliance Copper Kalamein Doors throughout the first two stories and Reliance Bay Windows throughout the first story.

Reliance doors, windows, partitions and trim are absolutely fireproof. Their attractiveness and permanence add that touch of refinement and character always sought for by those architects who seek to combine beauty with utility.

May we furnish estimates covering the work you now have in hand?

Reliance Fireproof Door Co.
Brooklyn, N. Y.

A Clause That Cancels The Loss of Millions

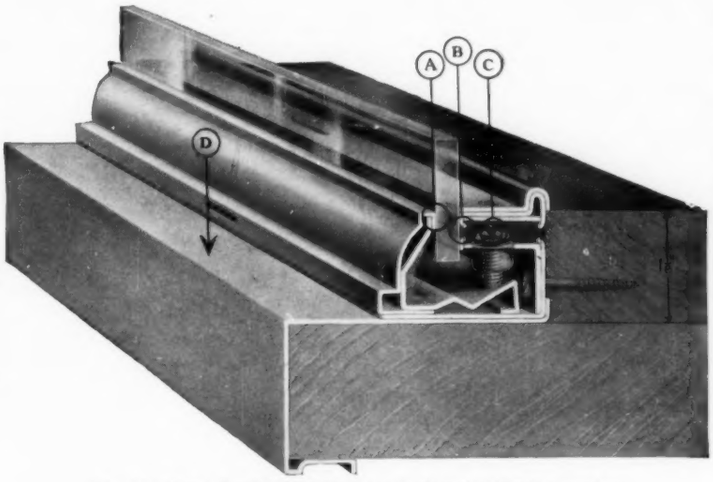
There are millions of dollars wasted every year in this country through plate glass breakage due to faulty setting.

This condition has no right to exist. This great waste of money, this burden borne by merchant and insurance companies alike—and indirectly by everyone—*can be prevented* by making the following clause a part of all store front specifications:

Glazing Specification

All Metal Sash, Corner Bars, Division Bars and Self-Adjusting Setting Blocks Used in Store Fronts Must Be Listed by the Underwriters' Laboratories

A is the point where the outer member presses against the glass, when the delicate watchlike turning of the key at C brings the glass automatically into contact with the rabbet of gutter B sliding on the anti-friction Murname Self-Adjusting Setting Block.



The Sill Covering D extends from the inner side of the rabbet to the lower edge of the face, eliminating joints—perpendicular screws or nails—positively protecting the wood against deterioration, for leakage is impossible.

No. 110 Zouri Combination Key-Set Sash and 705 Sill Covering

Here is the logical answer to the plate glass breakage evil. Give it your hearty support. It will materially reduce the total wastage.

All Zouri Key-Set Sash, Corner Division Bars and Self-Adjusting Setting Blocks have been listed by the Underwriters' Laboratories.

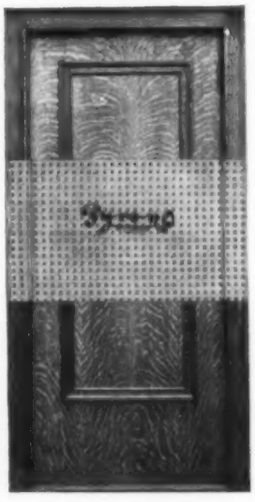
Zouri Drawn Metals Company

Factory and General Office

1630 EAST END AVENUE - - - CHICAGO HEIGHTS, ILLINOIS

Py-ro-no
TRADE MARK REGISTERED

FIREPROOF VENEERED DOORS *AND* TRIM



Magnified section before veneer is applied

Showing asbestos sheathing indented into core

PYRONO doors and trim are recommended for use in office buildings, hotels, hospitals, apartments, schools and similar types of buildings for the openings to stairways, elevators, pipe shafts, corridor and room partitions and wherever ornamental, fireproof doors are desired.

Pyrono doors and trim are furnished in any design desired and in any cabinet wood. They are installed by carpenters just as regular hardwood doors and trim are installed.

A Few Recent Installations

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Cunard Building, New York City
Commodore Hotel, New York City

Full information with details of construction will be furnished architects upon request

The Compound and Pyrono Door Co.

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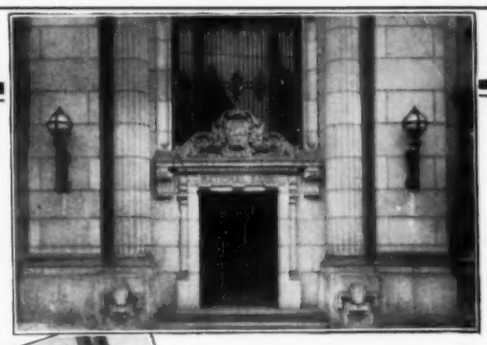
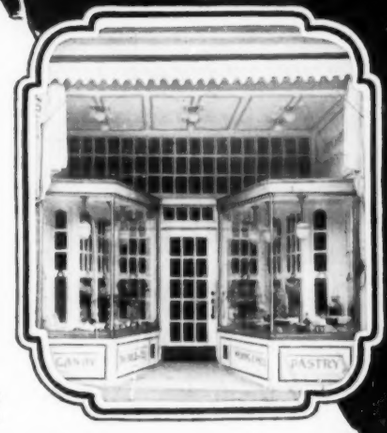


Exterior Lighting Fixtures for America's Architectural Triumphs

The architect who travels is sure to notice Smyser-Royer exterior lighting fixtures adorning impressive public buildings, extensive private estates and the more artistic town and country houses both large and small. For this complete line—ranging from quaint bracket lanterns to the most elaborate lighting effects—carries with it the complete assurance of superior craftsmanship and time-enduring beauty. Catalog "H" describes and illustrates more than 200 designs.

SMYSER-ROYER CO.
Main Office and Works, York, Pa.
Philadelphia Office, 1609 Sansom Street



See our advertisement on page 928 of Sweet's

Brasco for Appearance

YOUR clients will favor Brasco Copper Store Fronts above all others because of their sightly appearance. A Brasco job is a delight to the eye—permits of the utmost in display space—helps them sell more goods. All important points—but even more so is Brasco permanence.

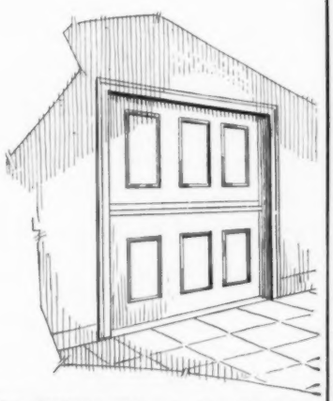
Just a reminder to send today for Brasco full size portfolio of details.

BRASCO MANUFACTURING CO.
5031 SOUTH WABASH AVENUE, CHICAGO, ILLINOIS

WE PROPOSE to be modest in our advertising, but to tell the truth we cannot refrain from saying that PEELLE Truckable, Counter-balanced Freight Elevator Doors have more installations to their credit than any other doors of their type in the world.

They are the most exactingly constructed and the most efficient, safest doors of their kind. At any rate, the truth is never egotistical.

PEELLE
COUNTERBALANCED - TRUCKABLE
Freight
ELEVATOR DOORS



K-3—PEELLE Kalamein Paneled Door, three solid panels in each half. (Labeled by Underwriters' or Factory Mutual Companies as specified.)

PEELLE Doors are operated either manually or electrically. This and every other feature is fully detailed in "Elevator Door Efficiency," our new catalog. May we send you a copy gratis?

THE PEELLE COMPANY
BROOKLYN • NEW YORK
Branch Offices:
Boston Cleveland Chicago Philadelphia
Agencies in Twelve Cities in the United States and Canada

ALBERT PICK

208-224 WEST RANDOLPH ST.

THERE is no institution in the world like Albert Pick & Company—none that approaches it in scope of service. To know its many ways of serving you is a necessity, an obligation to your clients and yourself.

Albert Pick & Company is the largest house in the world engaged exclusively in furnishing and equipping Hotels, Apartment Hotels, Clubs, Hospitals and Institutions, Restaurants, Kitchens, School and Industrial Lunch Rooms, Soda Parlors, Billiard Halls, Bowling Alleys and other establishments catering to the general public.

We specialize in complete equipment for such establishments. We co-operate with you to the fullest extent, safeguarding your plans with correct equipment and furnishings. Our planning and engineering service, the most extensive of its kind in America, is at your service.

Correspondence is invited. You are cordially invited to avail yourself of these service facilities without fee or obligation. Our representative will call if desired.

Literature of particular value to the Architect has been prepared and will be sent upon request. Simply advise us what subject you are interested in.

Equipment for Restaurants, Cafeterias and Lunch Rooms.

Public Service Kitchens.

Hotel, Apartment Hotel and Institution Installations.

Door Beds, Kitchenettes and other Space-Saving Fixtures for Residential Buildings.

Industrial Lunch Rooms, Clubs and Industrial Housing.

School Cafeterias and Domestic Science Equipment.

General Catalog of Furnishings, Equipment and Supplies.

Soda Fountains and Supplies.

Billiard and Bowling Equipment.

Club Room Equipment.

Store Fixtures.

Bakery Equipment.

Refrigerators.

Barber Shop Equipment.

Furnishings and Equipment

& COMPANY
CHICAGO, ILL.

Our Factory and Warehouse in Chicago, containing 13 acres of floor space. Here much of our merchandise is manufactured. Here also are our warerooms containing the products of factories other than ours.

Small illustrations show Albert Pick & Company's Woodworking Plant, Chicago; Silverware Factory, Bridgeport, Conn.; Sales and Display Rooms, Chicago; and Retail Branch (Burley & Company) Chicago.

for Public Service

These Floors

of Marbleloid Flooring are Fireproof, Coldproof, Attractive, Non-Abrasive, Non-Slipping, Durable, Strong and Economical

Office of The American Pulley Company, Philadelphia, Pa., showing Marbleloid Floor in Tile Design.

MARBLELOID is a standardized light-weight composition flooring which is manufactured and installed by our organization, and which is guaranteed without restriction by us. It is laid plastic, sets in a few hours into a seamless, smooth-surfaced floor, good for a lifetime of service.

Two million feet are specified annually for Hospitals, Schools, Offices, Public Buildings, Industrial Plants, Banks, Hotels, Apartment Houses, Etc.

A Marbleloid Floor gives a pleasing appearance to an office.

Every Marbleloid Floor regardless of its use possesses the qualities of handsome appearance, lastability and fire resistance. The floors are not all alike, however, in composition. The formulae is varied according to kind of usage the floor will receive. There are many Marbleloid Floors installed in fine residences and there are many Marbleloid factory Floors standing up day after day under the operation of light trucks. The materials were mixed at our factory to give the desired floor properties.

Marbleloid Floors combine the durability and attractiveness required in welfare rooms.

A Marbleloid Floor in a Hospital where its Sanitary Qualities are greatly appreciated.

Marbleloid will not dust off under abrasion or wear, so is particularly suitable where delicate machinery is to be used. It is resilient and untiring to the feet. It can be supplied in different non-fading colors or color combinations. It never needs repairs. It can be laid upon old or new wood floors, concrete or steel. It transforms an old worn wood floor into a handsome, durable and sanitary modern floor. It is an economical type of flooring.

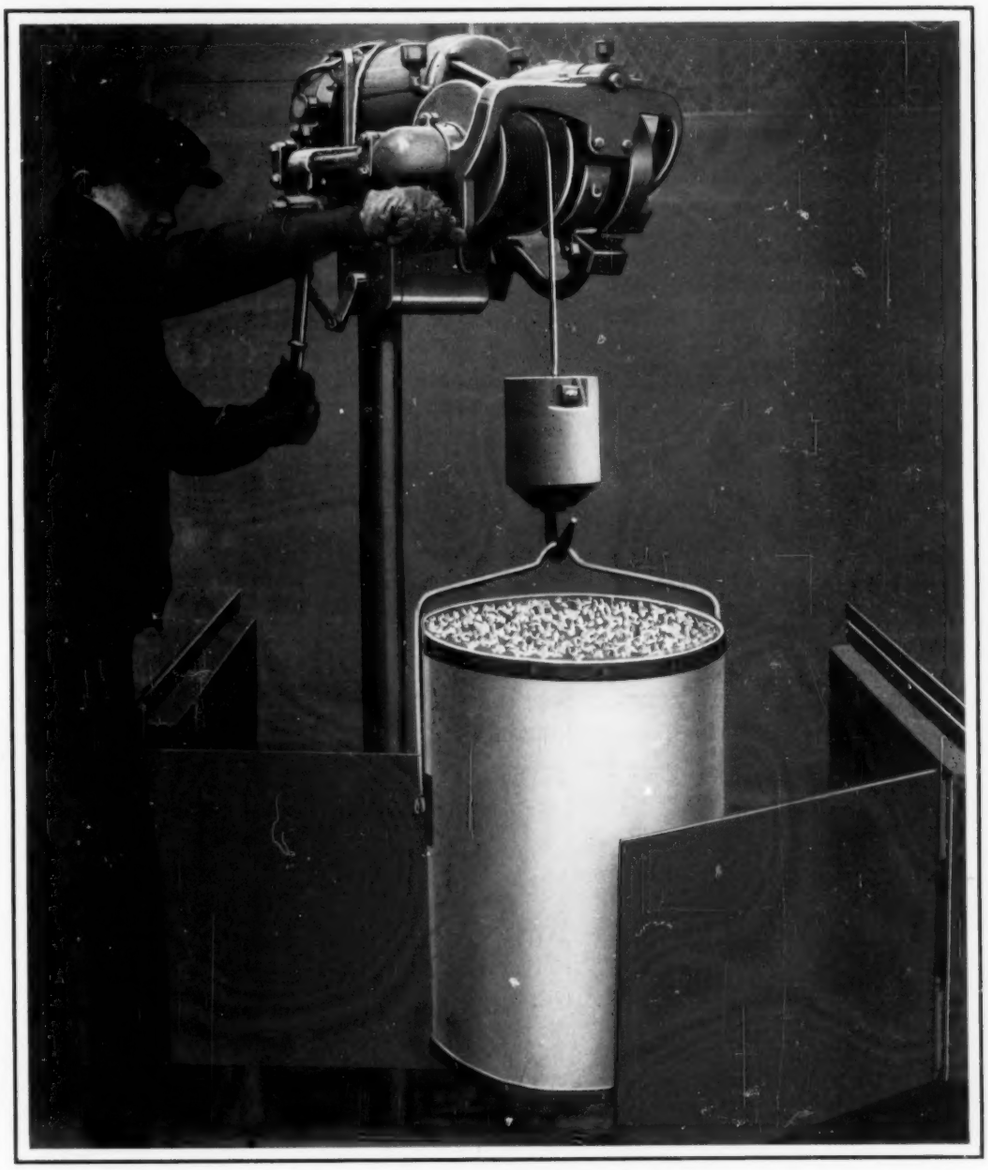
Architects are invited to write for specifications, samples, color card, list of complete contracts, etc. Also see Sweet's.

THE MARBLELOID COMPANY - 1404 Printing Crafts Bldg., New York

MARBLELOID

The Universal FLOORING for Modern Buildings

In New York Public Schools



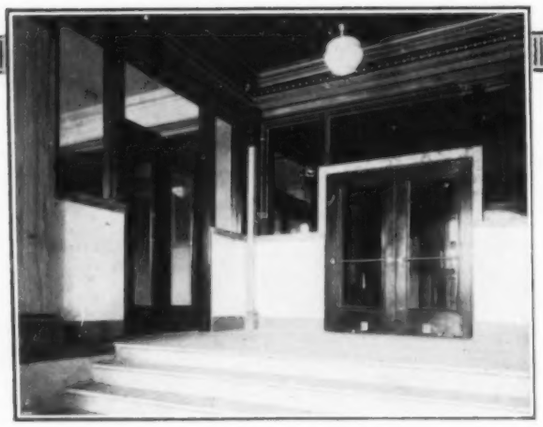
Model E. Electric Hoist in Use at P. S. No. 73, Boro of Brooklyn, New York City. C. B. J. Snyder, Architect

The G&G ELECTRIC REG. U.S. PAT. OFF.
Telescopic Hoist
With Automatic Stop and Gravity Lowering Device

PROOF of economical operation of G&G electric ash removal equipment is clearly demonstrated by results of test (one of a series) made for us at P. S. No. 73 by engineers of the Sprague Electric Works. Raising filled cans and lowering empty cans under actual working conditions, distance of lift being 14 ft. 0 in., current consumption was at the rate of 231 CANS IN ONE 7 cent KILOWATT HOUR. Full details upon request. G&G Hoists are rendering satisfactory service in 43 of the modern schools in New York City, 35 of which are Model E.

GILLIS & GEOGHEGAN, 544 West Broadway, New York

Specifications in SWEET'S. *Specifications and scale drawings in G&G Catalog*



FIREPROOF?

Yes. The construction of the building is backed with Hollow Metal Doors.

ILLUSTRATION OF HENDRICKS COUNTY COURT HOUSE, DANVILLE, IND.
Clarence Martindale, Architect

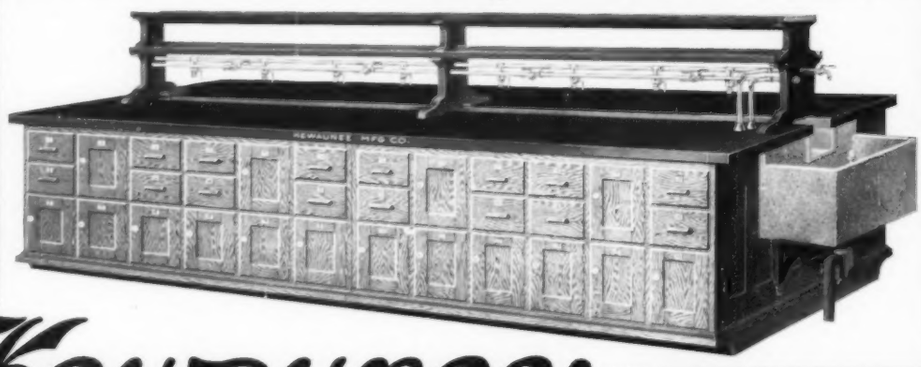
DAHLSTROM METALLIC DOOR COMPANY
425 Buffalo Street Jamestown, N. Y.

NEW YORK OFFICE
25 Broadway

DETROIT OFFICE
1331 Dime Bank Building

CHICAGO OFFICE
19 So. LaSalle Street

Representatives in All Principal Cities



Kewaunee
LABORATORY FURNITURE

In building the schools, hospitals and industrial plants of the country, you are frequently confronted with real problems in the planning of adequate laboratory equipment.

When you meet a laboratory problem face to face, please remember that there is a group of men in Kewaunee, Wisconsin, who have been working out similar problems for a lifetime.

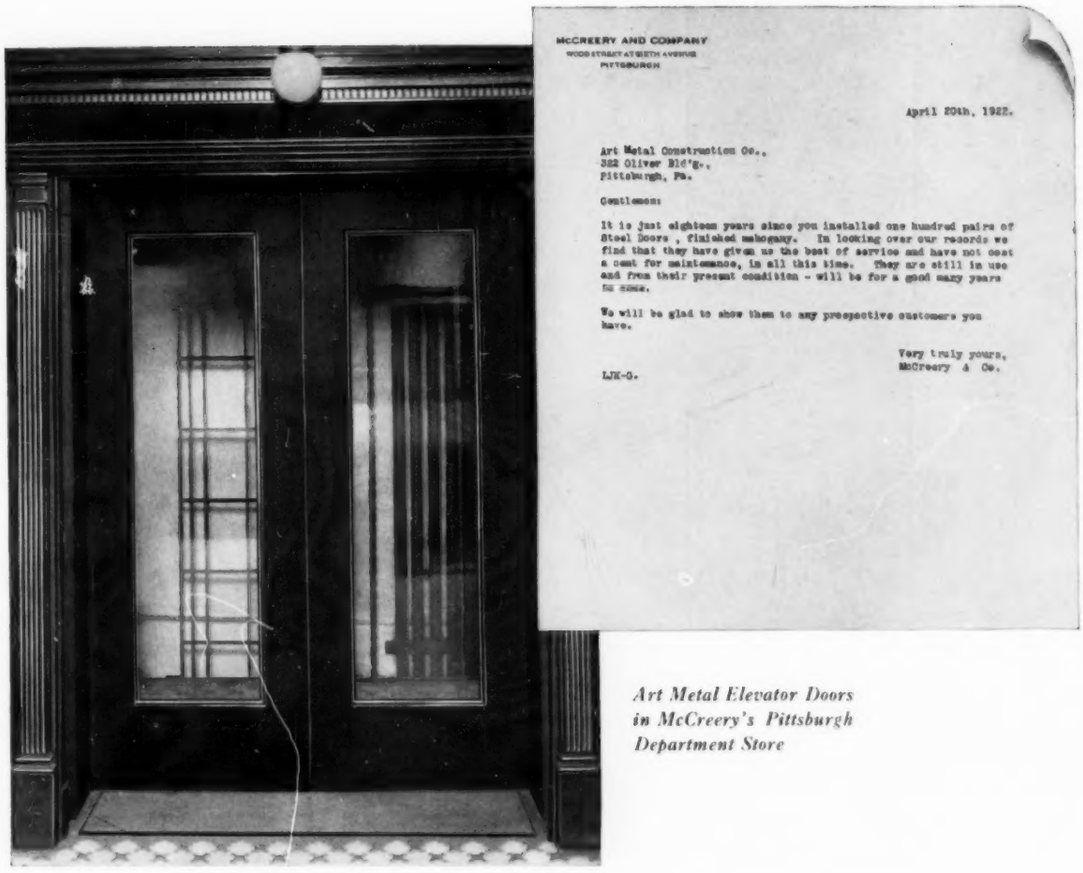
The experience we have gained in equipping thousands of schools, hospitals and industrial plants all over America is yours on request, without obligation.

New York Office
70 Fifth Avenue

Kewaunee Mfg. Co.
LABORATORY FURNITURE EXPERTS

141 Lincoln St.
Kewaunee, Wis.

Branch Offices: Chicago, Minneapolis, Kansas City, Houston, Little Rock, Phœnix, Omaha, Jackson, Miss., Denver, Baton Rouge, La. San Francisco, Albuquerque, Columbus, Spokane, Oklahoma City, Greensboro, N. C., Salt Lake City, Toronto, Canada



McCREERY AND COMPANY
WOOD STREET AT SIXTH AVENUE
PITTSBURGH

April 20th, 1922.

Art Metal Construction Co.,
322 Oliver Bld'g.,
Pittsburgh, Pa.

Gentlemen:

It is just eighteen years since you installed one hundred pairs of Steel Doors, finished mahogany. In looking over our records we find that they have given us the best of service and have not cost a cent for maintenance, in all this time. They are still in use and from their present condition - will be for a good many years to come.

We will be glad to show them to any prospective customers you have.

Very truly yours,
McCreery & Co.

LJK-G.

Art Metal Elevator Doors in McCreery's Pittsburgh Department Store

Art Metal Doors defy time and hard usage

ART METAL—pioneer maker of steel office equipment—is also a pioneer in the production of interior hollow metal.

The illustration of elevator doors in McCreery's is just one example. After eighteen years hard, day-in, day-out usage these doors are still holding their own in operation, appearance and service. And Art Metal Architectural Hollow Metal service is better today than ever before.

You can save time, reduce costs and insure satisfaction to your clients by availing yourself of this service.

Let us cooperate with you on your next door and hollow metal installation.

Art Metal
Jamestown New York
U. S. A.

Art Metal

JAMESTOWN, NEW YORK

World's Largest Makers of Steel Interior Equipment

ROME Quality
BRASS & COPPER

Pencil sketch of Gibson Hotel addition
Gustave W. Drach Architect

Superior and unfailing service in this splendid hotel

IT is of vital importance that the plumbing of a hotel be unfailing in its service. Slow running and rusty water, due to corroded pipes, is sure to meet with the disfavor of guests. Broken and leaky pipes are annoyances which are not easily forgotten.

In the new addition of the Hotel Gibson, Cincinnati, Ohio, trouble free and lasting plumbing service is provided by Rome Quality Seamless Brass Pipe. Brass Pipe is unaffected by corrosion, and consequently does not fall victim to the "ills" that beset most other pipings. Rome Quality assures full flows of clean water at all times. Its life is practically without limit; and due to freedom from repair, it is far more economical. Its first cost is the only cost.

The specification of Rome Quality will provide your clients with a service that is unfailing and permanent.

BRASS COPPER BRONZE

Sheets; rolls; rods; anodes; tubes, brazed and seamless; strips; extruded shapes; angles and channels; tapered tubes and hose pipes; door rail; commutator bars and segments; electrical copper bar; and rivets and burs.

ROME BRASS AND COPPER COMPANY ~ ROME, N.Y.

BRASS ROME COPPER

The EMPIRE EXTENSIBLE—a partition that can be contracted or expanded to fit practically any space

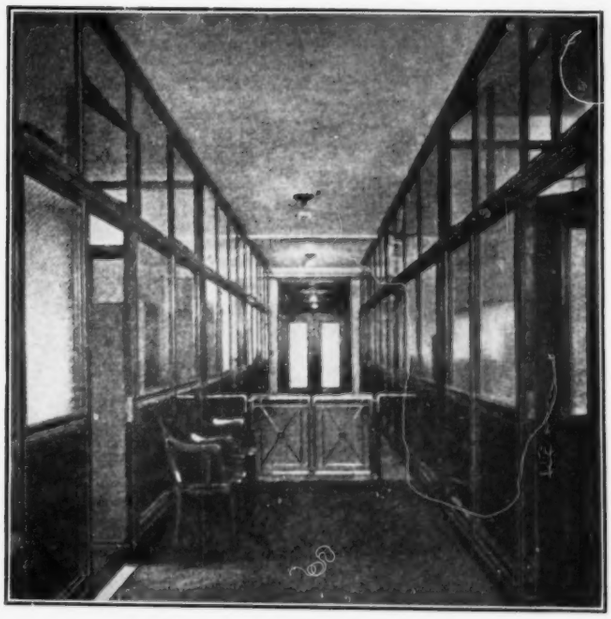
With this partition in place the requirements of a new tenant for re-spacing can be arranged with a minimum of dirt and confusion, with no lost time or expense in tearing down plaster walls or dismantling wood partitions. Just a few hours of clean work at a slight cost for labor only and the rooms are ready.

Empire Steel Partitions are flexible and adjustable. Adjustment to any ceiling height (see illustration) is done at the lower cornice line, below which point all material is of standard height.

Finished in any Baked Enamel Finish, such as Mahogany, Circassian Walnut, American Walnut, Oak, Olive Green, etc.

Solves Office Partition Problems

Flexible Movable and Durable



Adjustable - Easily Erected - Low Cost

· Write for Booklet ·

EMPIRE STEEL PARTITION CO.

COLLEGE POINT, N.Y.

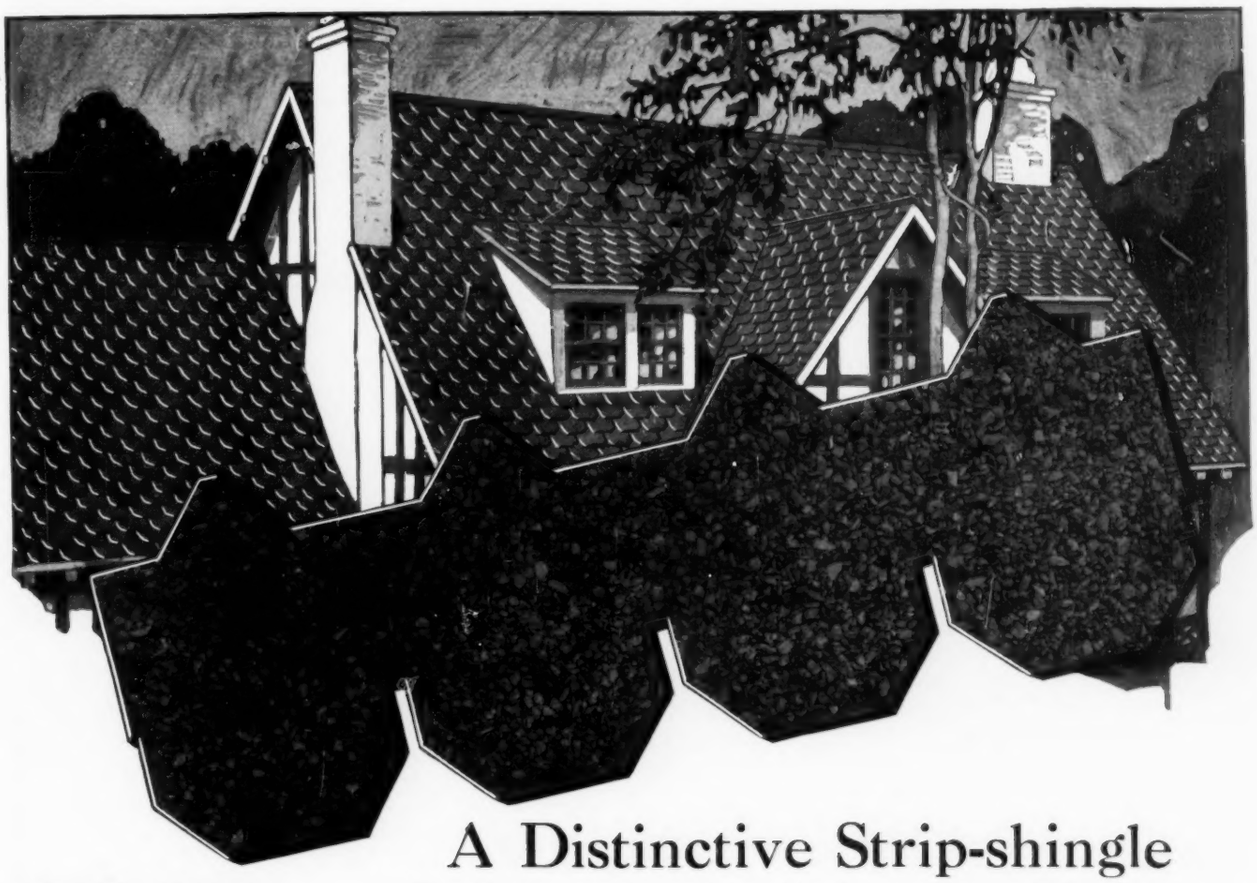
The accepted principles of concrete construction require a form for the wet concrete—that is why a protecting shell is used in the forming of Raymond Concrete Piles. This shell is left in place in the ground, forming a permanent protection to the setting concrete.

RAYMOND CONCRETE PILE COMPANY

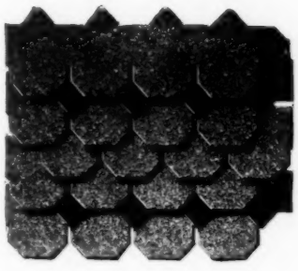
New York: 140 Cedar Street Chicago: 111 West Monroe Street

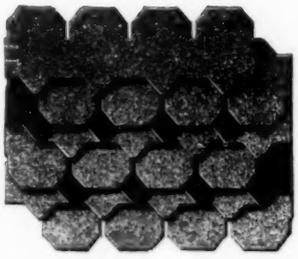
Montreal, Canada: Raymond Concrete Pile Co., Ltd.

"A Form For Every Pile — A Pile For Every Purpose"



A Distinctive Strip-shingle





For shingling a new roof (or re-shingling an old one), Ruberoid Strip-shingles are unrivalled. Here is a shingle manufactured to meet a standard of quality rather than price. It affords unusual economy, due to its patented form, and in addition gives the home a touch of distinct individuality.

Ruberoid Strip-shingles will not curl. Their unusual thickness, which is in the felt and coating, prevents this. Even the under side of these shingles is heavily coated, an additional protection which ensures longer service.

Ruberoid Strip-shingles in the colors of red and green make possible nine differently designed roofs. You can thus please the individual taste of any client.

The scheme of combining two colors of slate surfacing, Venetian red and sage green, and reversing the strips, is shown in the two panels at the side. The third color—grey—may be used by simply turning the shingles over and exposing the heavily coated under side.

On request, we will gladly send you an attractive folder picturing the various designs in color, and describing the Ruberoid Strip-shingle in greater detail.

The RUBEROID Co.
95 Madison Avenue, New York
Chicago Boston

RU-BER-OID
SHINGLES AND ROOFING

Charity Hospital, New Orleans, La.

THIS hospital, built in 1838, did not have the modern electrical conveniences afforded by the use of electricity until lately.

Realizing the necessity of wiring the hospital with a system that can be depended upon, the directors selected NATIONAL Metal Molding. For the complete system, 35,000 feet of NATIONAL Metal Molding was used.

Specify it in your next remodeling plan.

NATIONAL PRODUCTS
N M M Co.

National Metal Molding Co.

Pittsburgh, Pa.

Safely from Ridge to Ground

THE *roof* catches the rain or snow, but it is the valleys, gutters and leaders that carry the rain or melted snow to the ground.

If valleys or gutters *leak*, due to rust or corrosion, decorations and furnishings are at the mercy of the elements, *no matter if the roof proper is in perfect condition!*

If Valleys and Gutters are

TARGET-AND-ARROW ROOFING TIN

(Prior to 1905 called Taylor's "Old Style")

decorations and furnishings are absolutely safe, for TARGET-AND-ARROW is made to *last*, and while its first cost is slightly more than ordinary roofing tin it will save many, many times the original investment by preventing costly damage to the favorite furniture and fittings.

If you have not received your copy, send for "THE ACHILLES HEELS OF A BUILDING," a graphic chart showing where gutters, valleys, flashings and other vital spots occur in the roof of a building and explaining how and why "Target-and-Arrow" assures permanent protection to these important places.

N. & G. Taylor Company

312 Chestnut Street - Philadelphia, Pa.

Headquarters for good roofing tin since 1810

Look for this Trade ➸ *Mark on every Sheet*

KEYSTONE COPPER STEEL

Copper, the *Anti-Toxin for* Sheet Metal Rust!

COPPER—properly proportioned, puts into sheet steel a new measure of endurance and resistance to rust that cannot be attained without its help. It makes a new metal of steel.

KEYSTONE COPPER STEEL

Soft and ductile of itself, copper is the martial music that adds the grit of fight wherever rust threatens. It is steel's most effective ammunition. Use it for longer wear—and greater permanence.

For roofing, siding, gutters, spouting, eaves trough, sheet metal and tin work, use Keystone quality Galvanized Sheets and Roofing Tin Plates—better for both architect and owner. Proved by actual time and service tests. Sold by leading metal merchants. Demand the genuine.

We manufacture Sheet and Tin Mill products for all purposes. Write for full information and our interesting booklet, "Copper—Its effect upon Steel for Roofing Tin."

American Sheet and Tin Plate Company

General Offices: Frick Building, Pittsburgh, Pa.

DISTRICT SALES OFFICES:

Chicago Cincinnati Denver Detroit New Orleans New York Philadelphia Pittsburgh St. Louis

Export Representatives: UNITED STATES STEEL PRODUCTS COMPANY, New York City

Pacific Coast Representatives: UNITED STATES STEEL PRODUCTS COMPANY, San Francisco, Los Angeles, Portland, Seattle

Carey

BUILT-UP ROOFING

Cedar Rapids, Iowa
March 23, 1922

The Philip Carey Company,
3611 Loomis Place,
Chicago, Illinois

Re McKinley & Roosevelt Jr.
High Schools

Gentlemen:

Carey's No. 7 Feltex Built-up Roofing is being used on the above jobs. It was specified by us and accepted by the Board as the best roof that could be had for the money. The roof on the McKinley building has been in place about three months; the Roosevelt building roof will be put on in about six weeks.

Yours very truly,
BERT RUGH, ARCHITECT

SEE OUR CATALOGUE IN SWEETS

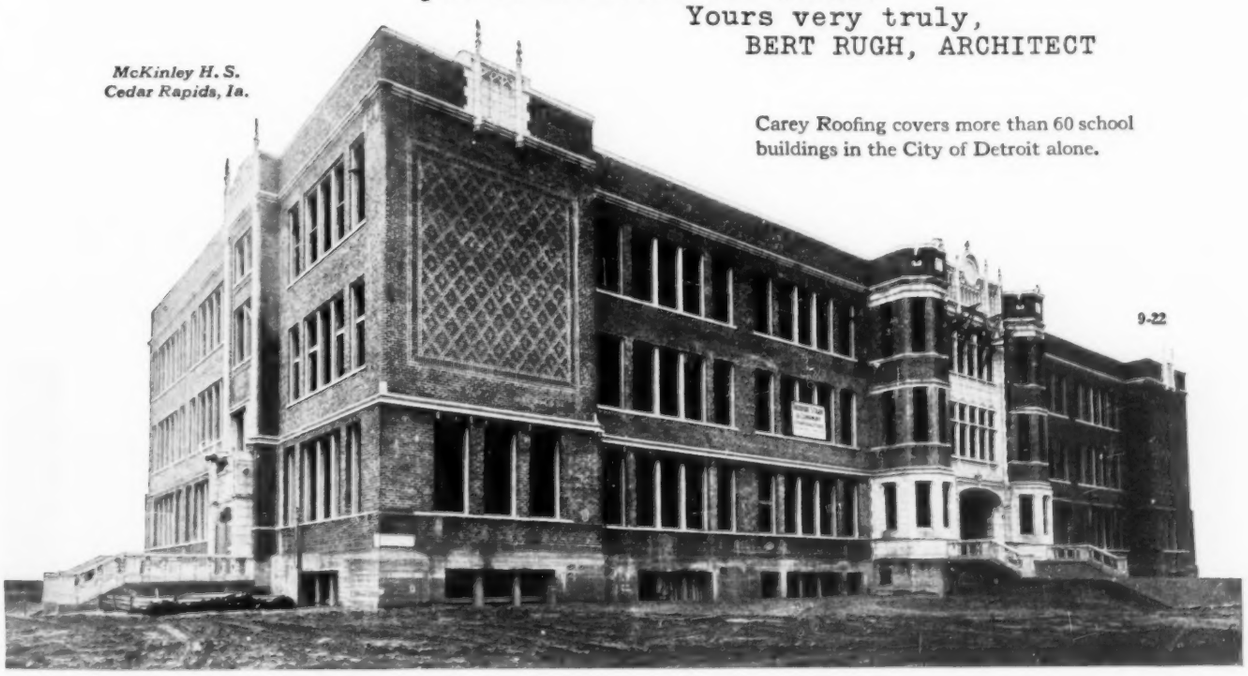
Write for specification book.

The Philip Carey Co.
504-524 Wayne Ave.,
Lockland
Cincinnati, Ohio, U.S.A.

"A Roof for Every Building"

McKinley H. S.
Cedar Rapids, Ia.

Carey Roofing covers more than 60 school buildings in the City of Detroit alone.



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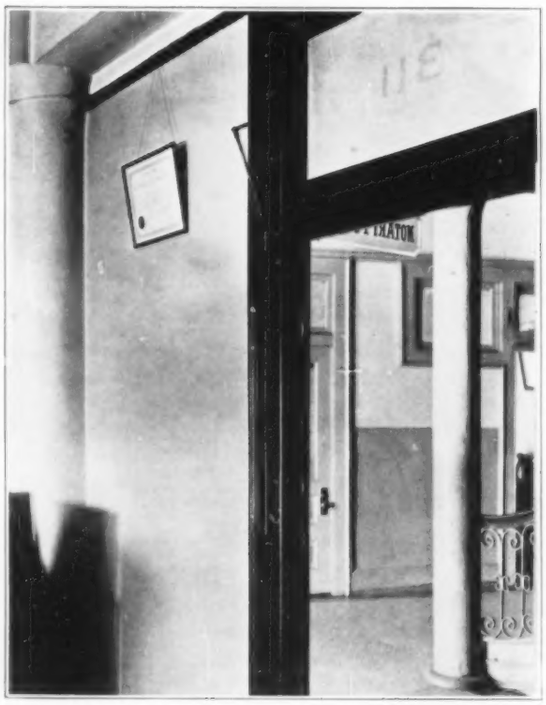


Moore Building, San Antonio. Partitions are made of 27-gauge Kno-Burn with channels 12" on centers

2" Partitions —18 Years Old— *Prove* Their Merits

WHEN the Moore Building was erected in San Antonio, partitions were made of 27-gauge Kno-Burn Metal Lath plastered on both sides, to a thickness of 2".

Today, 18 years later, these partitions are firm and free from cracks—mute testimony to the substantial character of such construction. And now 22 architects in that city are specifying this kind of construction.

Apart from the economy there's another advantage in

Kno-Burn METAL LATH

"The steel heart of plaster"

solid partitions—they save wonderfully in space, about 1 square foot to every 50 in an average size room, as compared with hollow block construction.

Solid partitions are becoming a factor of such importance in certain types of buildings—hotels, hospitals, schools, etc.—that makers of electrical equipment are now making equipment so shallow that it will not unreasonably extend beyond the plastered surface.

In "Fireproof Construction," which we shall be glad to mail you upon request, you will find recommended specifications and full details for 2" solid partitions.

NORTH WESTERN EXPANDED METAL CO.

Manufacturers of Kno-Burn Metal Lath, Econo, Presteel Lumber, etc.

1234 Old Colony Building
CHICAGO

New York Atlanta Los Angeles Boston Cincinnati Minneapolis St. Louis Dallas

NORTHWESTERN EXPANDED METAL CO.
CHICAGO

Ambler Asbestos Shingles

THEY solve the burning question. They can't burn, because made of two "unburnable," indestructible materials—selected asbestos fiber and high grade Portland cement.

They also solve the question of how to keep down upkeep. They are as permanent as they are attractive, requiring no painting or replacing.

Ask us to show their application to the building in which you are interested.

Asbestos Shingle, Slate & Sheathing Company

Dept. L, Ambler, Pennsylvania

Branch Offices: Atlanta, Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Minneapolis, New York, Philadelphia, Pittsburgh, Washington, Wilkes-Barre, Montreal, Canada; Toronto, Canada

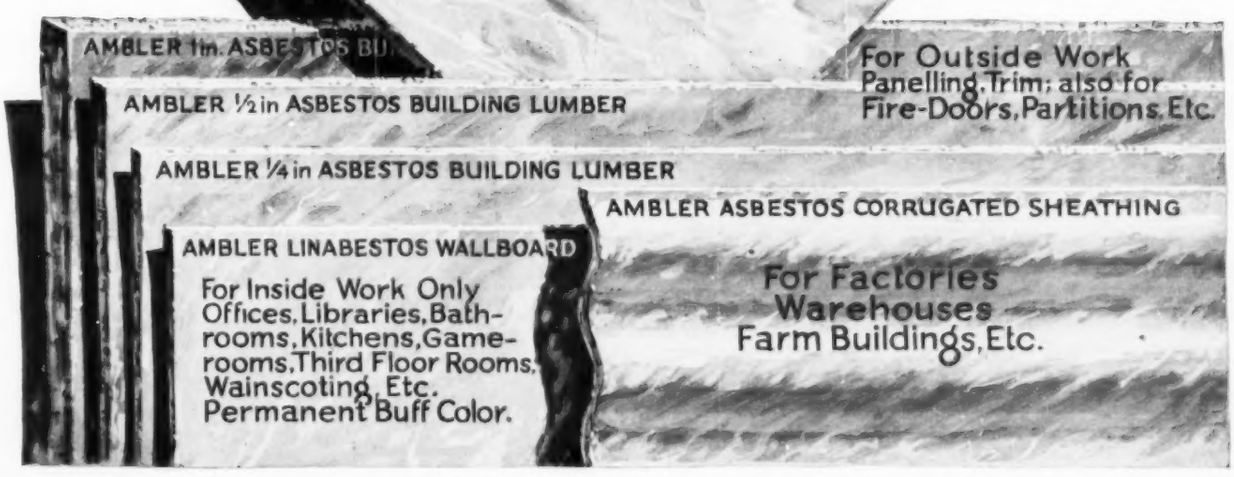
Southwestern Distributor: R. V. Aycock Co., Kansas City, St. Louis, Tulsa, Houston

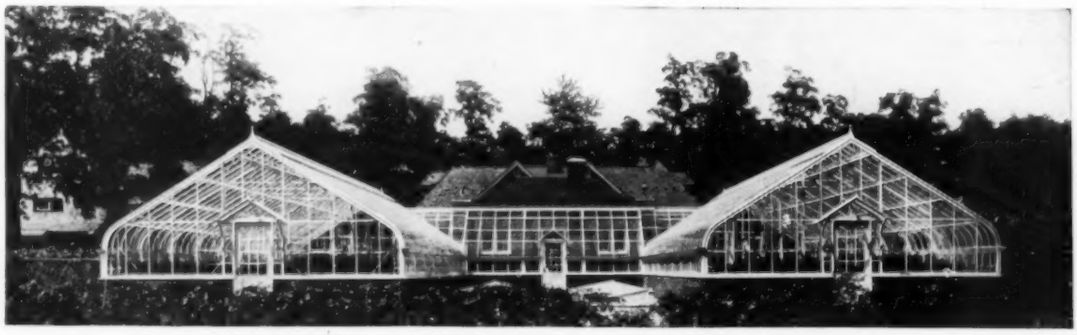
Western Distributor: J. A. Drummond, San Francisco, Los Angeles, Fresno

Other distributors throughout the country

Fireproof
Permanent
Attractive
Paint-Saving

Three Shapes, for laying in American, French or Honeycomb styles. Four Permanent colors—Newport Gray, Blue-Black, Moss Green & Indian Red

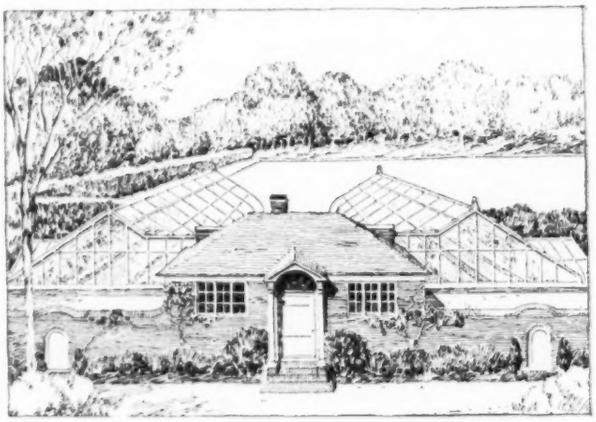




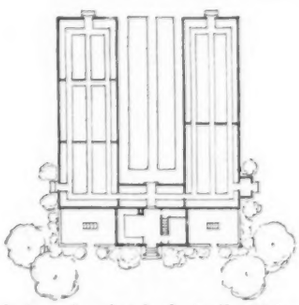
Interesting Parallel Layout
at Locust Valley, L. I.

Walker & Gillette, *Architects*

From the angle of greenhouse practicalness this layout is admirable in every way. The houses are spaced far enough apart so one casts no shade on the other, even on the shortest winter's day. The space also gives ample room for two rows of heated growing frames. The lean-to adjoining the service building, aside from its growing use, forms a passage to each of the houses. The construction is our Steel Frame with a modified curved eave.



A unique feature is the storage rooms on either side of the brick service building, in effect a garden wall



It is a plan that lends itself satisfactorily to enlargement, a point that always merits consideration

Hitchings and Company

Home Office and Factory, Elizabeth, N. J.

New York	Philadelphia	Boston 9
101 Park Avenue	133 South 12th Street	294 Washington Street

The famous Sherry's in the days of the hansom cab. Bridgeport Brass Pipe was installed when the building was constructed, and the same pipe re-installed when the building was remodeled 20 years later. This pipe is still in use today.

"Bridgeport" BRASS CO. TRADE MARK U.S.A. U.S.A.

Twenty-five years ago

McKim, Mead & White approved Bridgeport Brass Pipe

—and the same pipe is in use today

Twenty-five years ago, when the contracts were awarded for the construction of Sherry's Hotel under specifications drawn by McKim, Mead & White as Architects, this firm was already recognized as a leader among Architects. It was only three years later that the firm was commissioned to remodel the White House in Washington.

McKim, Mead & White did not risk its reputation on inferior materials. The specifications for the Sherry building called for the best of everything, and Bridgeport Brass Pipe was used throughout for hot and cold water service.

Three years ago when this building had outlived its usefulness as a hotel, it was remodeled under the direction of Cross & Cross, as Architects, to serve as a bank building for the Guaranty Trust Company. At that time Bridgeport pipe that was removed in making the alterations was found to be in perfect condition. In fact, the same pieces that were taken out were re-installed in the new layout, *being rated as good as new pipe.*

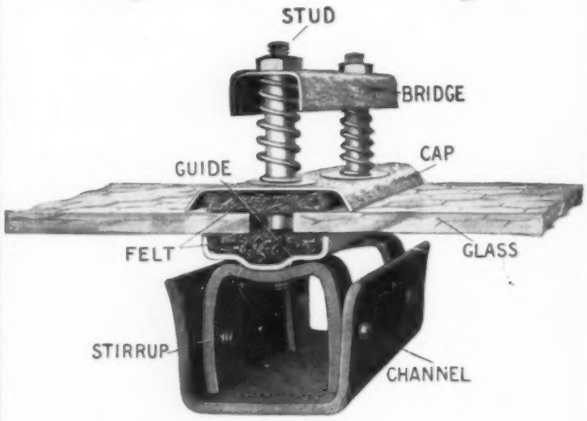
Twenty years of service made no appreciable impression on the Bridgeport Brass Pipe, and it gives promise of lasting as long or longer than the main structural elements of the building itself.

Bridgeport Brass Company
Bridgeport Connecticut

2323

Bridgeport Plumrite *The Improved* Brass Pipe

Skylights *for* All Purposes



"Anti-Pluvius" Puttyless Skylights are adaptable to all styles of skylight construction in general use—the saw-tooth skylight with or without ventilating sashes, the single-pitch and double-pitch skylight, the plain hipped skylight, the hipped type with round or ridge ventilators, and the hipped turret skylight with either movable sash or fixed louvers.

Our new catalogue contains complete details of construction and installation. Write for a copy

THE G. DROUVÉ COMPANY
Bridgeport, Connecticut, U. S. A.

DAYLIGHTING ENGINEERS

Residence, Hackensack, N. J.; Architects, R. C. Hunter & Bro., N.Y.C.

Samson Spot Sash Cord

was used in this house. The difference in cost between Spot Cord and common cord for the *whole house* would just about pay a carpenter to replace *one* broken cord.

Specify **Samson Spot Cord** and be sure of satisfied clients. The Colored Spots make superintendence simple.

Trade Mark Reg. U.S. Pat. Off.

Samson Cordage Works
Boston, Mass.

"Giant Metal," "Red Metal" and Steel

SASH CHAINS

CABLE CHAIN

Fifty-one thousand feet of our No. 2 "Red Metal" Sash Chain has just been furnished the George A. Fuller Co. of the Orient, Ltd., for use in the Marinouchi Building, Tokio, Japan.

An idea of the length and size of this building may be obtained by comparing the amount of chain furnished for it, and the amount necessary for the Woolworth Building, New York City, which contains fifty thousand three hundred feet of our No. 1 "Giant Metal" Sash Chain, installed over ten years ago.

Quality and Service are the two basic principles of our business. The chain used in the Woolworth Building has given the best of satisfaction and we guarantee all our chain. The chain for the Marinouchi Building was furnished from stock and was shipped the day after order was received.

Why not use the best?

See Page 1092, Sweet's Catalog

The Smith & Egge Mfg. Co.
BRIDGEPORT, CONN.

ORIGINATORS OF SASH CHAINS

E.S. 1827 & CO.

Nearing the Century Mark in VARNISH MAKING

Our products have been specified by architects *continuously for ninety-five years.* What endorsement could be greater?

Superior Floor Finishes

The market affords no more perfect floor finishes than those made for the architect's specifications by Edward Smith & Company

Trade **I-X-L Floor Finish** Mark

Accentuates beauty of natural grain, long in wear — a long used, perfect product.

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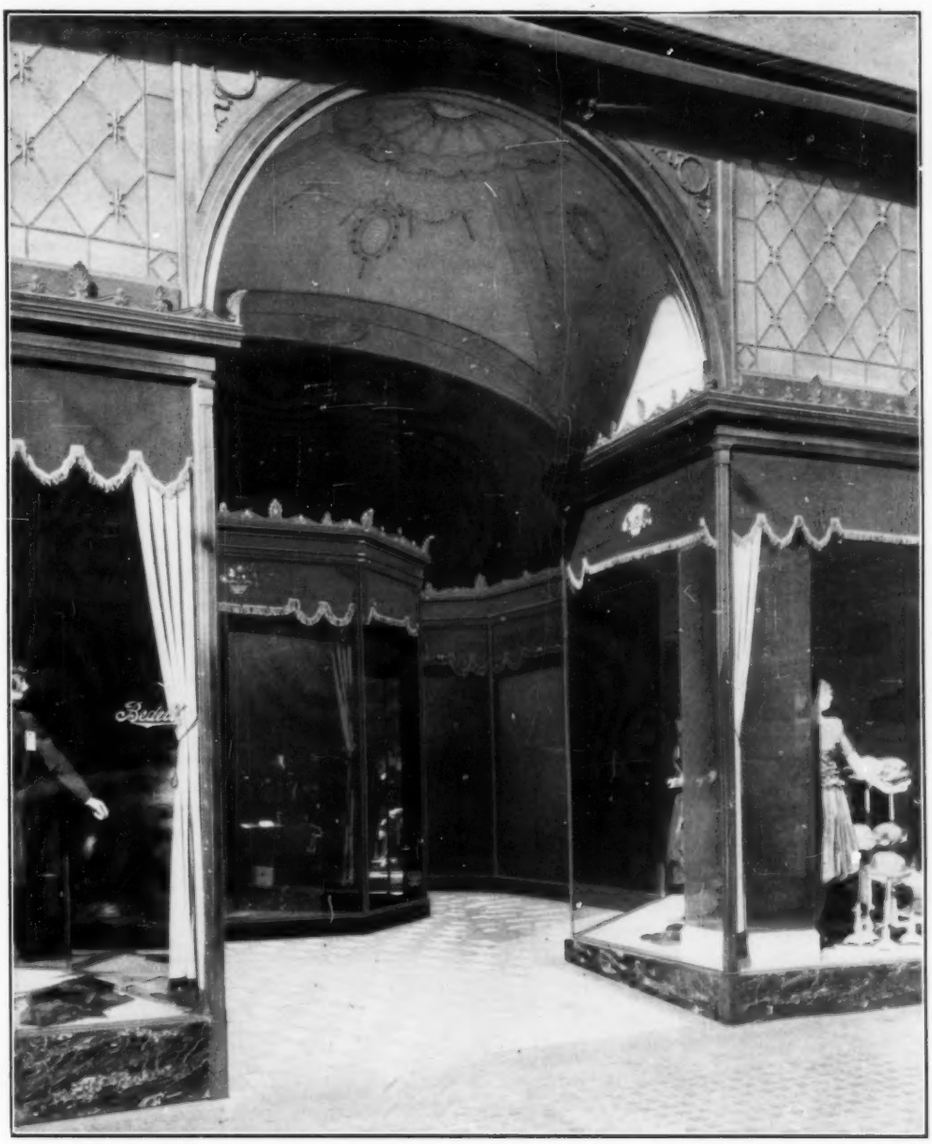
Practically proof against heel marks and water spots. Contains no wax. Dries with a satin-like finish. Strongly serviceable and singularly beautiful.

Edward Smith & Company's Varnishes, Floor Finishes and Enamels commend *themselves* — each the best for its specific purpose

Have you our Booklets? Send for finished panels

EDWARD SMITH & CO.

West Avenue, 6th and 7th Streets, Long Island City
P. O. Box 76, City Hall Station, New York City
Western Branch, 3532-34 South Morgan Street, Chicago



What Resiliency Means in a Store Front

Plate Glass in all Kawneer Store Fronts is Held Between the Sturdy but Resilient Grip of Two Spring Shaped, Solid Copper Members. This Resiliency, a patented and exclusive Feature of Kawneer Glass Settings guarantees to the Merchant that his Show Windows will give him the UTMOST SERVICE—that his breakage will be reduced to a Minimum.

The service value of Kawneer Resilient Grip, Glass Settings has proven to be satisfactory in more than 150,000 Kawneer Fronts in the most successful stores.

Our branch offices or sales agencies in all of the large cities will be pleased to co-operate with architects.

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STORE FRONTS

THE KAWNEER COMPANY
NILES, MICHIGAN

SARGENT HARDWARE

FEDERAL RESERVE WAREHOUSE
New York City

YORK & SAWYER
Architects

THE ADAPTABILITY OF

SARGENT

hardware to various types of governmental buildings is demonstrated by the number that we have equipped throughout the country.

That the specifications of the representative men of the architectural profession include SARGENT HARDWARE is also a fact worthy of special note.

SARGENT & COMPANY
Manufacturers
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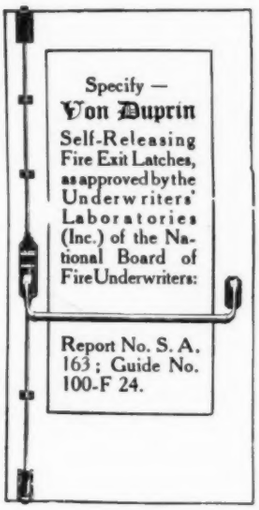
Sargent Hardware is sold in all cities by representative dealers

Von Duprin

Self-Releasing Fire Exit Latches


Specify —
Von Duprin
Self-Releasing Fire Exit Latches, as approved by the Underwriters' Laboratories (Inc.) of the National Board of Fire Underwriters:
Report No. S. A. 163; Guide No. 100-F 24.

Rocking the Boat

The fellow who rocks the boat *may* be lucky enough to avoid upsetting it.

And the man who saves a few dollars by eliminating the Von Duprin latches from the specifications *may* also be lucky; he may never have a fire or a panic in his building.

But the fact remains that the man who gambles with human lives is guilty of gross negligence, even though, through sheer luck, he escapes the consequences.

The adequate protection of those within a building includes not only fireproof construction, but also the installation of Von Duprin Self-Releasing Fire Exit Latches. In case of fire or panic, the mere touch of hand or body on the Von Duprin immediately opens the way to safety.

We suggest the wisdom of insisting that your clients play safe in a matter so vitally important.

See complete specifications in "Sweet's," pages 1212–1216, or ask us for Catalog 12-F.

VONNEGUT HARDWARE CO.
Indianapolis, Ind.

Alta Vista School
El Paso, Texas
Trost & Trost, Architects

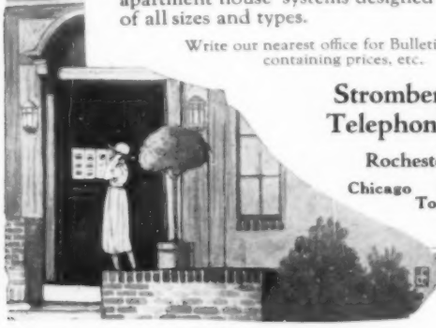
Stromberg-Carlson Telephones

For Modern Apartment Houses

These up-to-date equipments contribute much to the appearance of an apartment house vestibule. Every instrument is fitted with commercial standard apparatus of the same high quality as used on our public service exchange telephones.

There are various styles of Stromberg-Carlson apartment house systems designed for dwellings of all sizes and types.

Write our nearest office for Bulletin No. 15 containing prices, etc.



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Rochester, N. Y.

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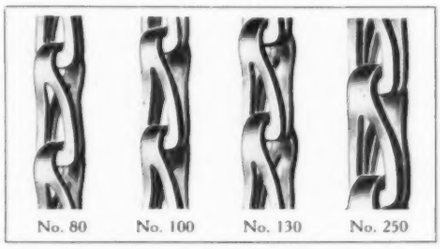
American Sash Chain

represents the maximum in strength and wearing qualities. It will outwear any other type of sash suspension material and always sustains its load.



No. 80 No. 100 No. 130 No. 250

We have standardized the sizes of chain to correspond with the weights of sash for which they are intended.

No. 80, for 80 pound double-hung Sash
" 100, " 100 " " " "
" 130, " 130 " " " "
" 250, " 250 " " " "

American Chain Company

Incorporated

Bridgeport Connecticut

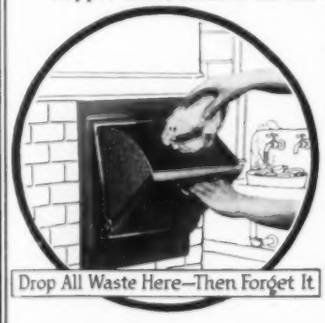
Boston
Chicago
New York
Philadelphia

Pittsburgh
Portland, Ore.
San Francisco

Are Your Last Year's Clients Disappointed Today?

EVERY week many letters are received from disappointed owners of fine, new homes who want to install the Kernerator. But in most cases it is too late, for the architect did not consider this modern system of garbage disposal in his plans and the chimney flues are not properly located or large enough to permit its installation after the house has been erected.

The unsightly, insanitary garbage can and waste receptacle need no longer be tolerated in the handsome residences of today. Their place should be taken by the Kernerator—a brick incinerator, built into the base of the chimney in the basement, which receives from the hopper door, located on the first floor in the flue, all household refuse, wilted flowers, broken crockery, tin cans and garbage. This material is lighted at intervals and burns itself up without odor and with no cost for operation.



Drop All Waste Here—Then Forget It

For complete details and specifications see page 1906 Sweet's 1921 Catalog.

Kerner Incinerator Co.

1015 Chestnut St., Milwaukee, Wis.

KERNERATOR

Built-in-the-Chimney

Reg. U. S. Patent Office

Albany Park Presbyterian Church, Chicago
Pond & Pond, *Architects*

T-M-B FLOORING THE Mastic Floor

Churches represent another type of structure for which T-M-B Flooring is particularly adapted.

The Albany Park Presbyterian Church, with T-M-B Flooring in the Sunday school rooms, corridors and retiring rooms, is one of a number of such edifices receiving excellent satisfaction from this flooring.

Let us explain its suitability for your various commissions. Write Dept. 2.

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133 W. Washington St. CHICAGO

Good Buildings Deserve Good Hardware

The Corbin Unit Lock with the keyhole in the knob is Good Hardware

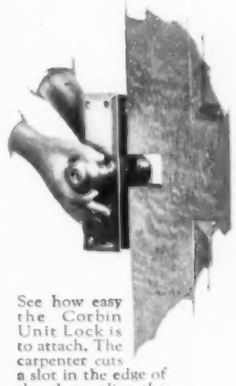
THERE is no better lock for a door than the Corbin Unit Lock. It is Good Hardware in every sense. The first ones made have been in service for more than twenty years and show no signs of wearing out.

With the Corbin Unit Lock, there is no groping in the dark—no guessing at the probable distance of the keyhole from the knob. To grasp the knob is to find the keyhole. It is in the exact center of the knob.

The Corbin Unit Lock is, as the name implies, a complete unit. Lock, screwless knobs and escutcheons leave the factory in one assembly, a single unit ready to be applied to the door. It is generally regarded as *the lock* for offices, hotel and apartment house rooms and for hollow metal doors in all classes of buildings. Also, in a fine range of designs, it is finding its deserved place on front and other outside doors of residences

In your work, don't overlook the security, the simplicity, the strength, the smooth dependable action and unequaled convenience of the Corbin Unit Lock. The host of friends this lock has won is evidence of a growing appreciation of the idea that *good buildings deserve good hardware.*

Corbin Unit Locks are made in a good range of Corbin designs, and in all Corbin finishes—architecturally appropriate for office buildings, hotels, public buildings and dwellings. Thousands have been installed in many of the finest buildings in this country.



See how easy the Corbin Unit Lock is to attach. The carpenter cuts a slot in the edge of the door, slips the lock into place and drives the screws through the escutcheons. He can put on five to eight Corbin Unit Locks in the time it takes to put on one of any other kind of lock.

If you haven't literature on the Corbin Unit Lock, won't you send for it?

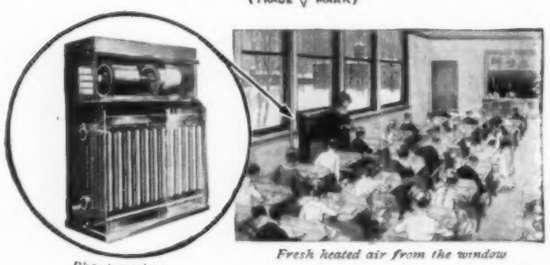
P. & F. CORBIN SINCE 1849 NEW BRITAIN CONNECTICUT

The American Hardware Corporation, Successor

NEW YORK CHICAGO PHILADELPHIA

UNIVENT

"LIVE OUTDOORS-INDOORS"
(TRADE MARK)



Phantom view *Fresh heated air from the window*

What the Jamestown and other school boards found out about the Univent

In 1914 the Board of Education of Jamestown, New York, made a thorough study of ventilating systems. As a result they approved and accepted the Univent idea for ventilating a school.

They did this because the Univent permitted each and every room to be ventilated independently of any other room. Instead of a system of long, uncleanable ducts and flues, each Univent took fresh air directly from outdoors, heated it, and thoroughly diffused it throughout the rooms.

This was their ideal of perfect ventilation—as simple and more positive than opening the windows—but without cold, dangerous drafts.

They found the absence of ducts saved space, lowered building costs and assured each room of its own individual supply of fresh air. When only one room was being used, only the Univent in that room was used. This saved operating cost. So, in 1920, when a big school building program was decided upon, the Jamestown School Board installed the Univent system in five more large schools.

In 1913, Utica, New York, tried out the Univent. Today nine schools in Utica are Univentilated.

School authorities, everywhere, from New York to California say the Univent makes class room air as fresh as outdoors. This perfect ventilation increases mental alertness and decreases sick leave.

The Univent is designed for schools and all buildings requiring mechanical ventilation; it may be installed in old or new buildings.

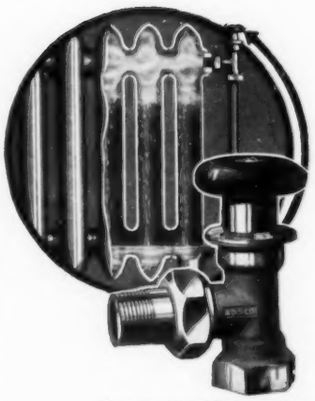
Having determined upon a Univent system the Architect can prepare his preliminary sketches without further thought to heating and ventilating, knowing that he will not have to tear down his building to install it, or be handicapped in meeting his estimate cost by addition of space or expensive construction.

Send for a copy of our 72-page Architects' and Engineers' edition "Univent Ventilation" or, better still if you have a ventilation problem, send us sketches or blue prints and let us make specific recommendations and estimate of cost. No obligation.

THE HERMAN NELSON CORPORATION
Dept. B, *Moline*, Illinois

No. 6 SCHOOL, JAMESTOWN, N. Y.
HAS COMPLETE UNIVENT INSTALLATION
C. C. Pederson, Architect, Jamestown, N. Y.

Flexibility That Insures Economy



Adsco Graduated Radiator Valve allows use of any desired part of radiation.

Adsco Heating gives positive control of steam at each radiator. That is one reason Adsco saves 20% to 30% fuel. No overheating. No waste of steam. Perfect comfort in all weather. No air valves, vacuum pumps or traps required. No noise possible.

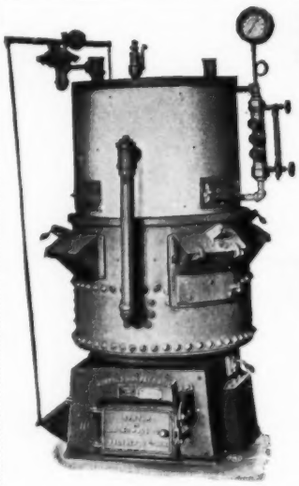
Adsco Heating is inexpensive to install with any make of house heating boiler. Hot water systems can be easily changed to Adsco Heating.

Write for Bulletin No. 158–AF which describes Adsco Heating for individual buildings. Bulletin No. 20–AF describes Adsco Community Heating of a group of buildings from Central Station Steam Plant. Architects, engineers and heating dealers should also ask for Bulletin No. 159–AF.

AMERICAN DISTRICT STEAM COMPANY
GENERAL OFFICES AND WORKS
NORTH TONAWANDA, N.Y.

Offices:
First Natl. Bank Bldg., Chicago — 1544 Woolworth Bldg., New York — Hoge Bldg., Seattle
1404 Arrott Bldg., Pittsburgh, Pa.

ADSCO HEATING



Durability

of the **Gorton Self-Feeding Boiler** is demonstrated by the fact that many of the boilers installed over 25 years ago are still in use giving entire satisfaction.

Efficiency

The **Gorton Self-Feeding Boilers** are built on the lines of Power Boilers, using the same material, thus securing the greatest Strength, Durability, and highest Efficiency.

The **Gorton Self-Feeding Boiler** gives a steady heat with attention only morning and night; its construction insures complete combustion of the gases and prevents the waste of coal.

See pages 2, 3, 4, 6, 8, 10, 11, and 13 of Catalog No. 88.

OUR NEW NO. 88 CATALOG IS READY—WILL BE SENT UPON REQUEST

Gorton & Lidgerwood Co.

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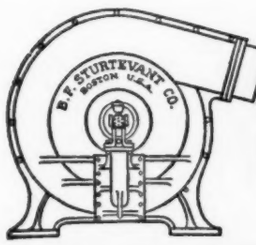
All Gorton Self-Feeding Boilers built to the "A. S. M. E. Standard"



Sturtevant

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PUTS AIR TO WORK

Architects: Graham, Anderson, Probst & White Contractor: J. J. Sherin

Main Banking Room, Federal Reserve Bank Building, Kansas City, Mo.

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Wherever an impressive structure, such as the Federal Reserve Bank Building of Kansas City, is to be erected the architect invariably turns to Sturtevant for the Heating, Ventilating and Air Washing Equipment.

Because he knows how reliable and satisfactory such equipment has proven in hundreds of similar installations all over the country.

The benefit of the broad experience is yours for the asking. Our engineers will gladly cooperate with you in laying out an adequate System for any type of building.

A call on our nearest office will place the services of these specialists at your disposal.

B. F. STURTEVANT COMPANY

HYDE PARK, BOSTON, MASS.

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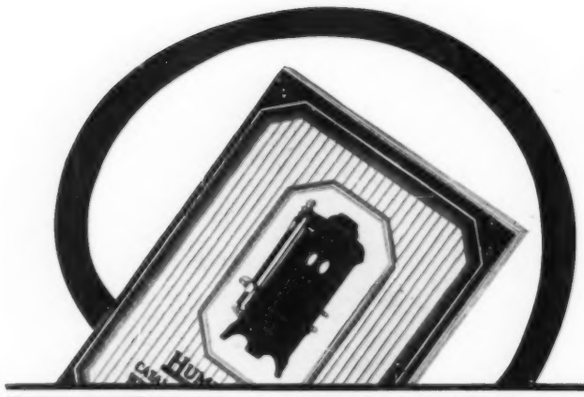


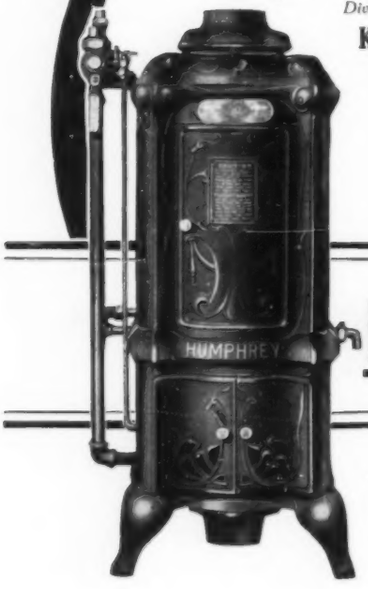
ARCHITECTS FIND IT A CONVENIENT REFERENCE BOOK

ARCHITECTS who have seen the new Humphrey Manual tell us that they are glad to add it to their reference library.

It is planned to save the time of the busy architect by furnishing detailed information about various types of gas water heaters, their capacities, operating cost and installation.

If you have not yet received a copy of this manual, we will be glad to send you one on request.

Humphrey Company
Div. Ruud Mfg. Co.
Kalamazoo
Mich.



HUMPHREY

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Industrial—Agricultural—Municipal—Residential

Over 3000 different types and sizes

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GOULDS

A Scientific Boiler Idea

AN intensely hot blue-white flame is produced by admitting more air (oxygen) to the very heart of the fire. The smoke and combustible gases are all consumed and remarkable heating efficiency attained.

Write for list of installations and descriptive catalog

Utica Heater Company, Utica, N.Y.
218-220 West Kinzie St., Chicago, Ill.
Branches In Principal Cities

Drawing-room in Residence of H. S. Snyder
Farmersville, Pa.

Duncan Fraser, Architect
New York

Save the Window and Wall Space for Furnishings—Not Radiators

WHEN you can give your client an efficient and economical heating system for a lower cost of installation and operation, why clutter up his rooms with ugly radiators? Give him a warm air system that will leave these spaces free for furnishings.

Many of the ablest architects are using The Kelsey Warm Air Generator both for their clients and in their own homes. Its peculiar construction utilizes every available heat unit in delivering warm, fresh air, at high velocity through inconspicuous registers in the floors or walls. Its automatic humidifier supplies the necessary moisture for comfort and health. It is heavy and durable and operates at a surprisingly low cost.

The Automatic Humidifier

Let us send you Booklet No. 5, which explains its method of operation, and we shall be glad to give you any further information you desire.

Our Engineering Department furnishes detailed plans and specifications insuring an installation that will accomplish exactly what is required.

NEW YORK OFFICE
565-F Fifth Ave.
(Corner 46th Street)

THE KELSEY
WARM AIR GENERATOR
(Trade Mark Registered)
251 James Street, Syracuse, N. Y.

BOSTON (9) OFFICE
405-F P. O. Sq. Bldg.

Trade Mark KELSEY HEALTH HEAT Registered

REG. U.S. PAT. OFF.
TRADE JENKINS MARK
Jenkins Bros

Valves can be judged by the company they keep

The citizens of San Francisco pridefully point to their city hall—and rightfully so. It is a structure of beauty, built to endure. Everywhere throughout this magnificent building is evidence of the care exercised in the selection of material and equipment.

It was quite the natural thing that Jenkins Radiator Valves were selected, for they are usually found in the company of the best.

Jenkins Valves contain more and the best metal. The extra strength contributes to their permanence in service. The strains of expansion and contraction of piping, that play havoc with light-weight, cheaply made valves, do not affect Jenkins Radiator Valves.

A Jenkins Radiator Valve is a product of care and precision, designed in every detail for maximum service, not merely the average. It is made of high grade steam metal; *spindle*, manganese bronze with large and accurate threads; *bonnet*, of ample dimension, fitted with metal *gland* or *follower* which compresses packing and prevents leakage around spindle. Interchangeability of parts is assured by careful and standardized manufacture. The Jenkins Renewable Disc with which Jenkins Radiator Valves are fitted always forms a perfect contact with the seat.

Fig. 168
Jenkins Angle Radiator Valve with union and wood wheel

You'll provide a permanent trouble-free service if genuine Jenkins "Diamond Mark" Valves are written into specifications.

JENKINS BROS.
New York Chicago Boston Philadelphia
Montreal London

FACTORIES: Bridgeport, Conn.;
Elizabeth, N.J.; Montreal, Canada.

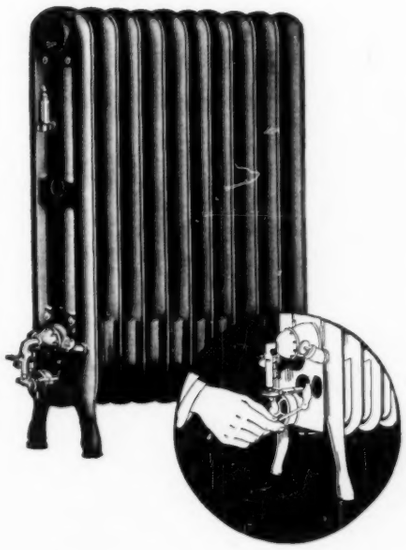
San Francisco City Hall. Bakewell & Brown, general architects; Leland & Haley, heating engineers; and Robert Dalziel, Jr., heating contractor, all of San Francisco.

Jenkins Valves
SINCE 1864

What the Chain Store Teaches

ENTERPRISES such as the Woolworth 5 & 10c Stores operate on a very narrow profit margin. All costs must obviously be kept to a minimum. It is significant, therefore, that practically every large chain store system in this country is a user of CLOW GASTEAM heating. Over five hundred of the United Cigar Stores, for instance, are CLOW GASTEAM heated.

CLOW GASTEAM radiators constitute the ideal method of store heating. They eliminate boiler, piping and cold storage, thus freeing the basement for other uses. They generate a real steam heat—with a humidity impossible to secure by other means. There is no soot or dirt. No janitor is required. And the heat can be turned off at night without danger of freezing.



The number of architects is rapidly increasing who specify CLOW GASTEAM heating on practically *every* job—either as the sole means of heat, or in conjunction with other systems.

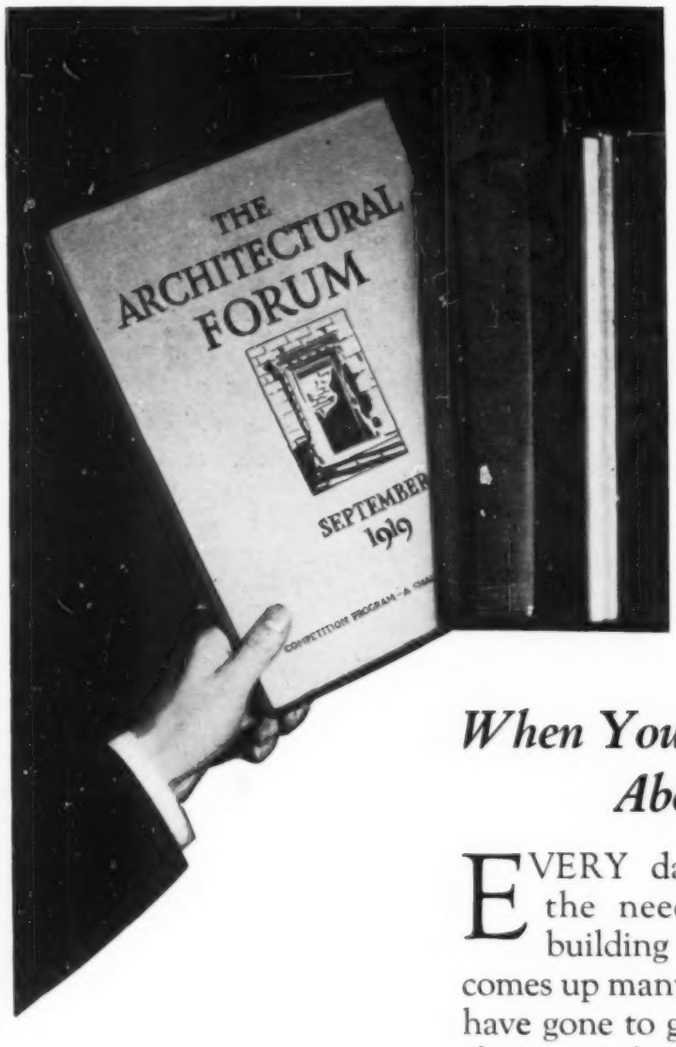
We are always glad to co-operate with architects in the solution of specific heating problems, as, for half a century, we have co-operated in problems of plumbing. Is our CLOW GASTEAM Handbook in your files?

JAMES B. CLOW & SONS

General Offices: 534-546 S. Franklin Street, Chicago

Sales offices in the principal cities

CLOW



When You Want Information About Catalogs

EVERY day in the architect's office the need for information about building materials and equipment comes up many times. The manufacturers have gone to great expense in describing their products in catalogs especially compiled for architects that will be convenient for you to file for quick reference.

THE ARCHITECTURAL FORUM publishes each month a carefully classified list of these catalogs so that you may know at a glance what is available.

Turn now to pages 67 to 74 of this issue and select those you need. Send us the list and we will see that you are supplied.

THE ARCHITECTURAL FORUM
142 BERKELEY STREET, BOSTON 17, MASS.

McKinley High School, Canton, Ohio

Architect—H. H. Hammond, Cleveland, Ohio

Engineer—Wm. Kingsbury, Cleveland, Ohio

Heating and Vent. Contractors, Huffman-Wolfe Co., Columbus, Ohio

Selected for the Finest School in Canton

NAMED in honor of Canton's most illustrious citizen, the late President, the McKinley High School is easily the most imposing educational edifice in that section of Ohio.

In accordance with the general scheme of the architect, engineer and contractors, to make this high school not only most commendable in appearance but a healthful and comfortable place as well, extreme care was taken in the selection of the ventilating equipment.

We are justly proud that, after due consideration, Clarage Kalamazoo Multiblade Fans were chosen. Two large Multiblade Fans located in the basement keep the entire building supplied with fresh, pure air, properly warmed in winter and cool in summer.

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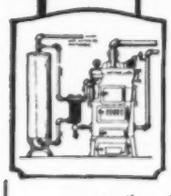

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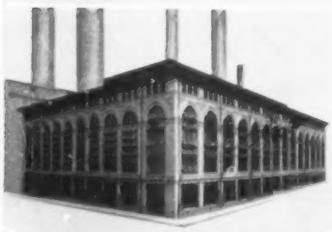

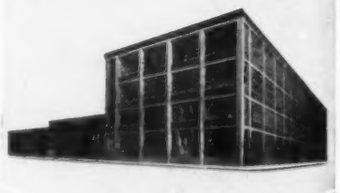

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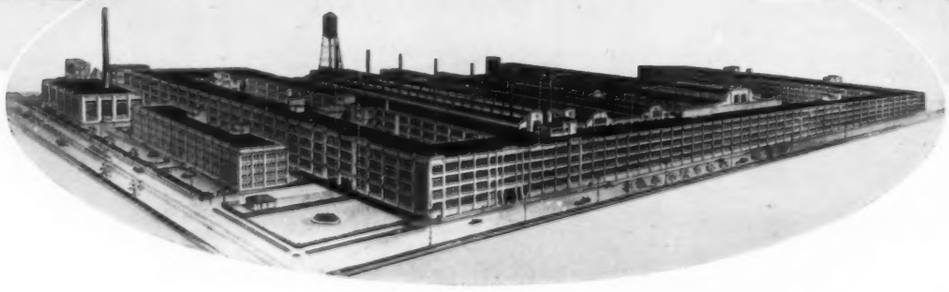

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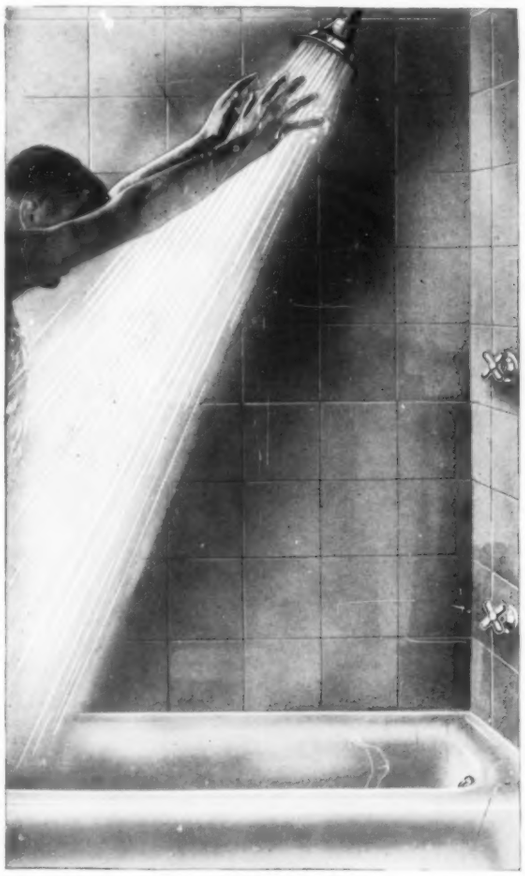

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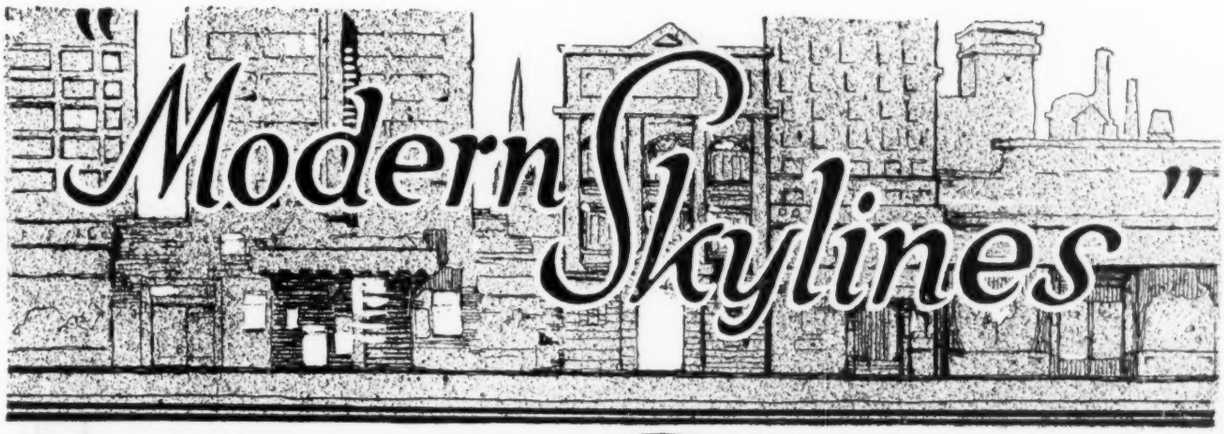

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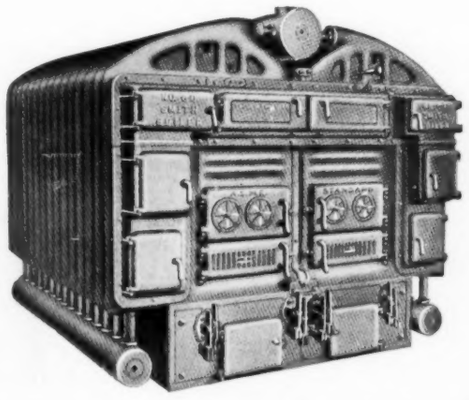

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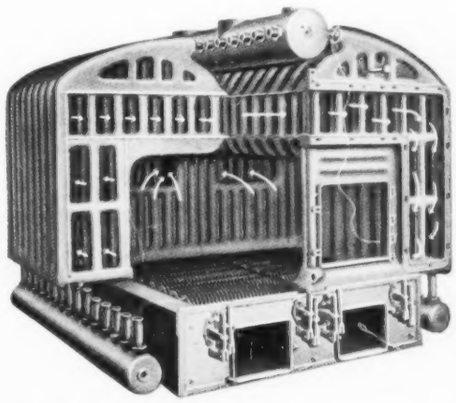

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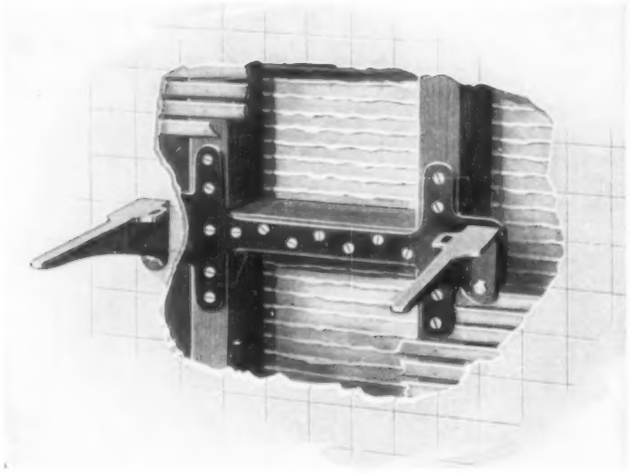

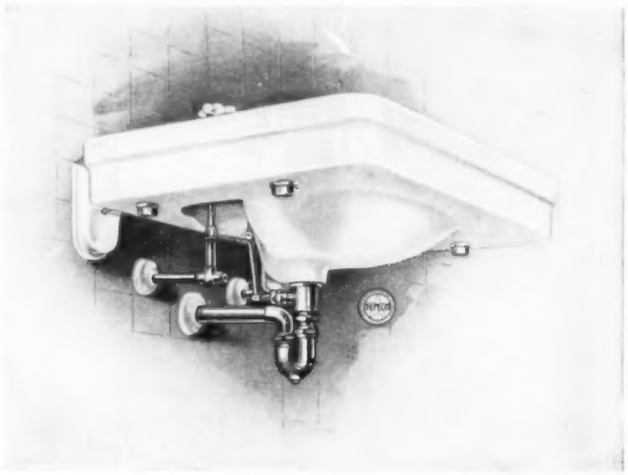

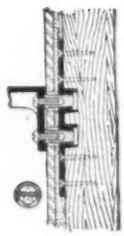

Cross Section showing how the Wall Carrier may be fastened to a stud partition, with screws.

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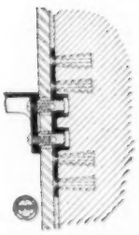
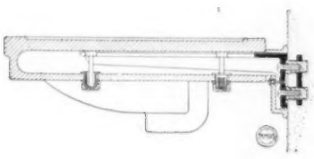


Cross Section showing how the Wall Carrier may be fastened to masonry, with expansion bolts.



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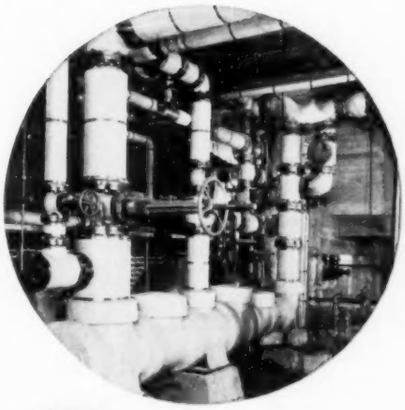

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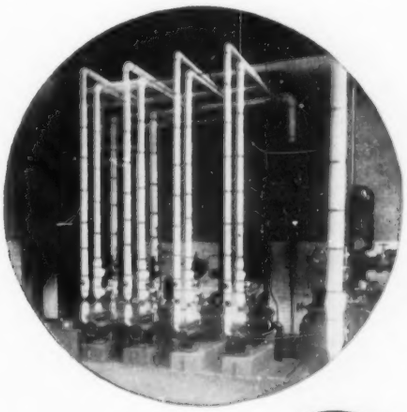

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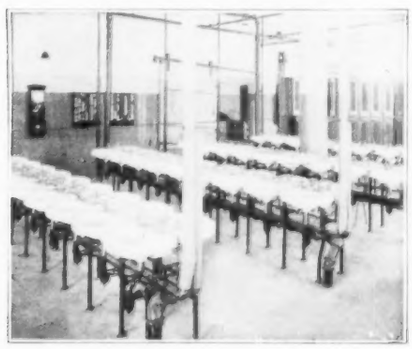

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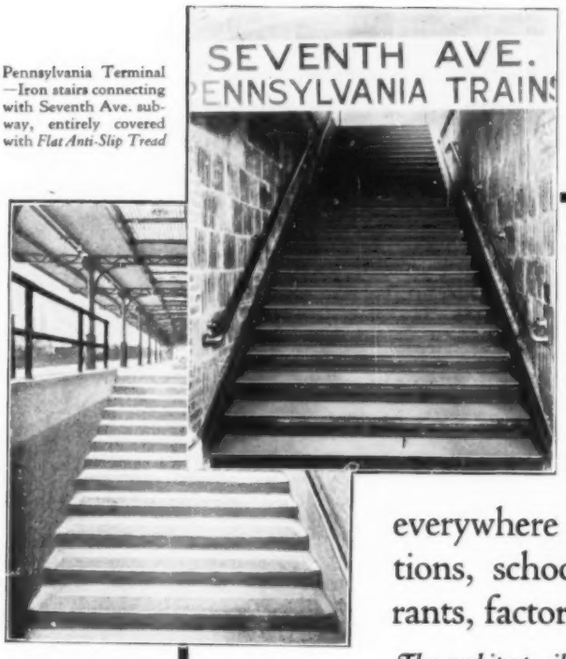

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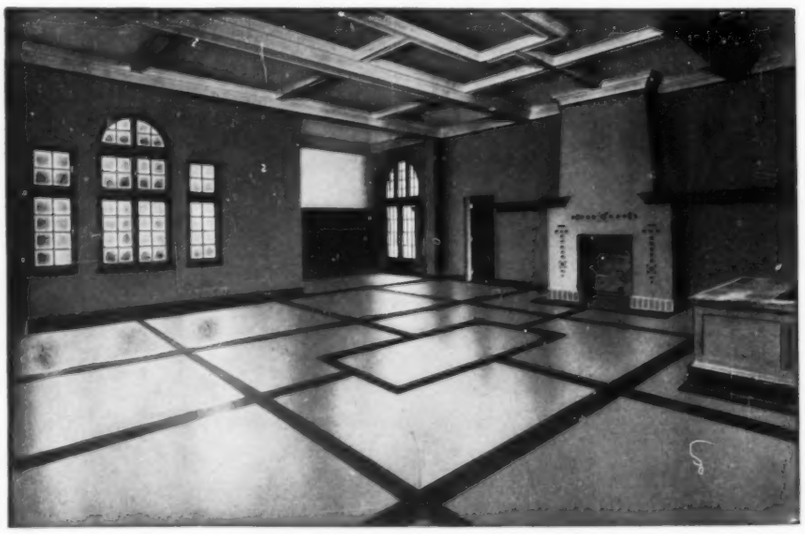

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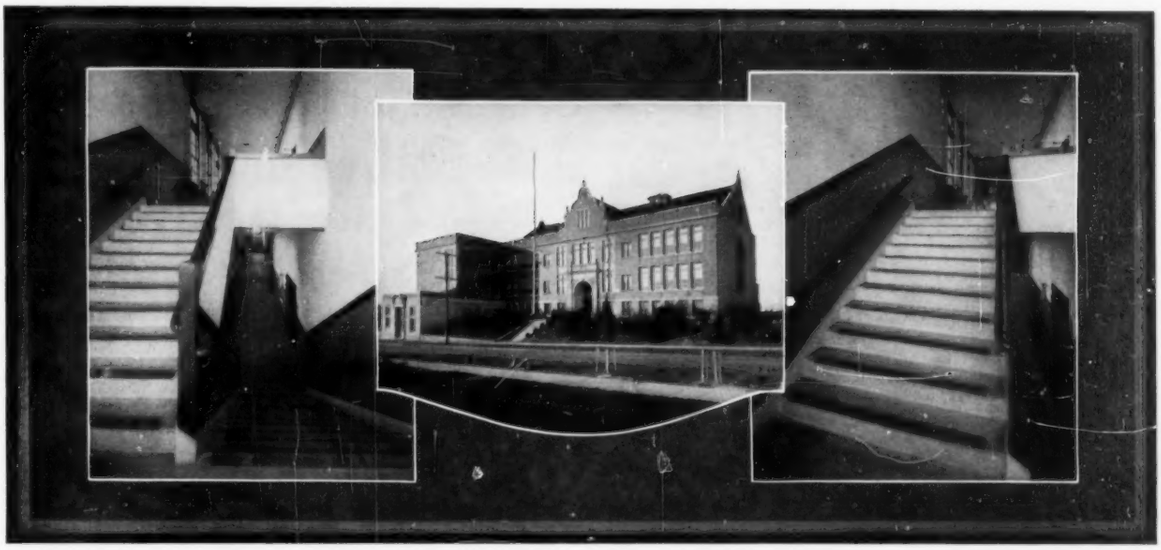

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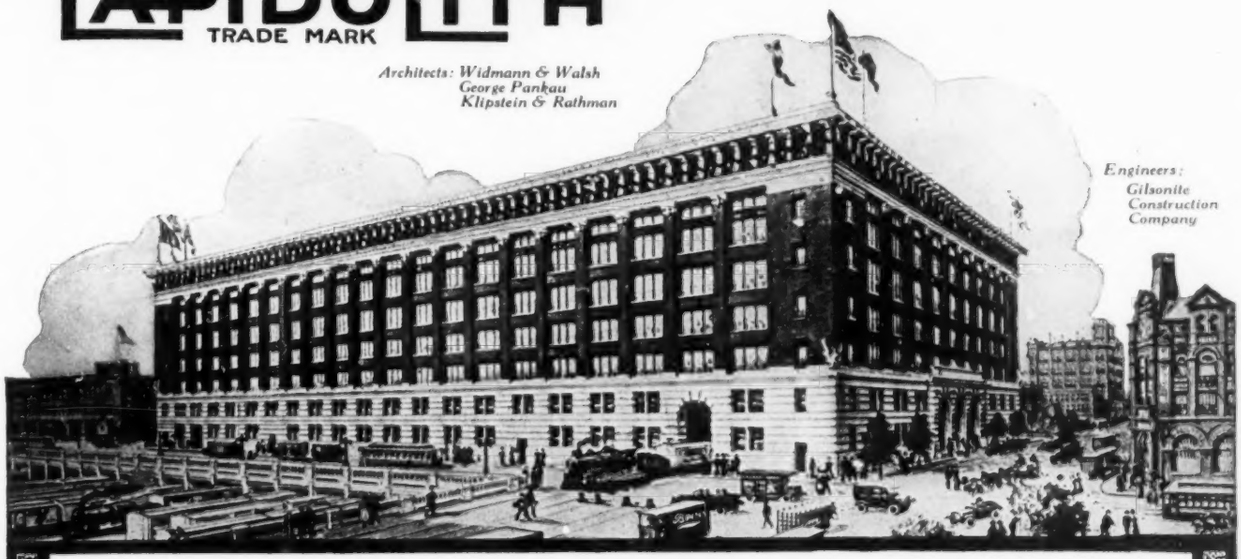

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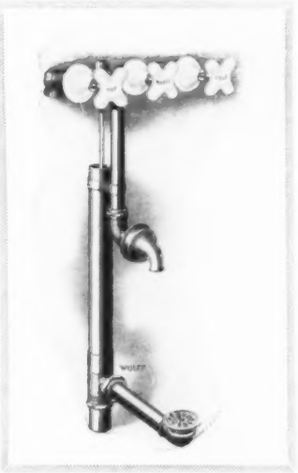

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